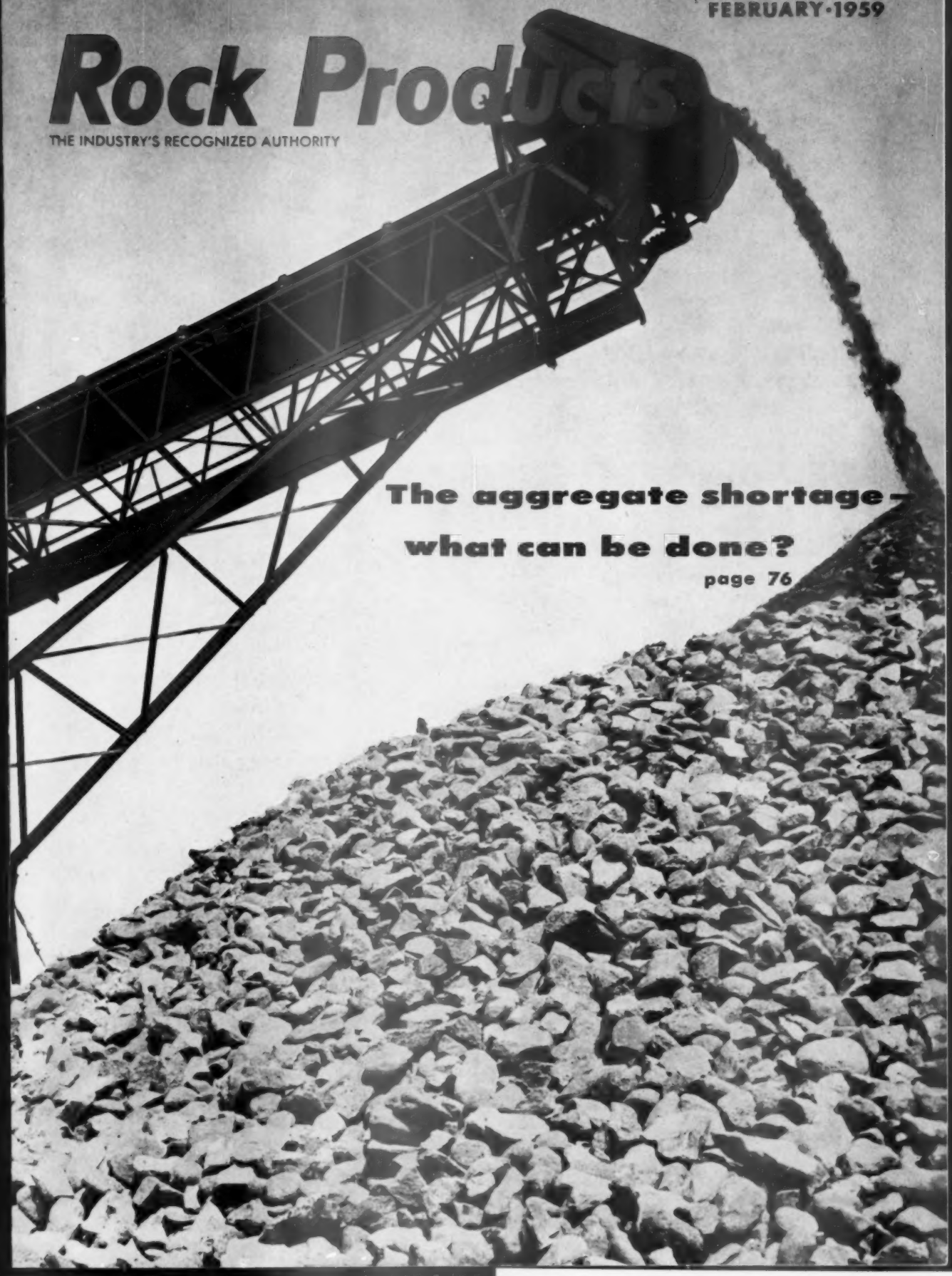
FEBRUARY·1959

Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY



The aggregate shortage— what can be done?

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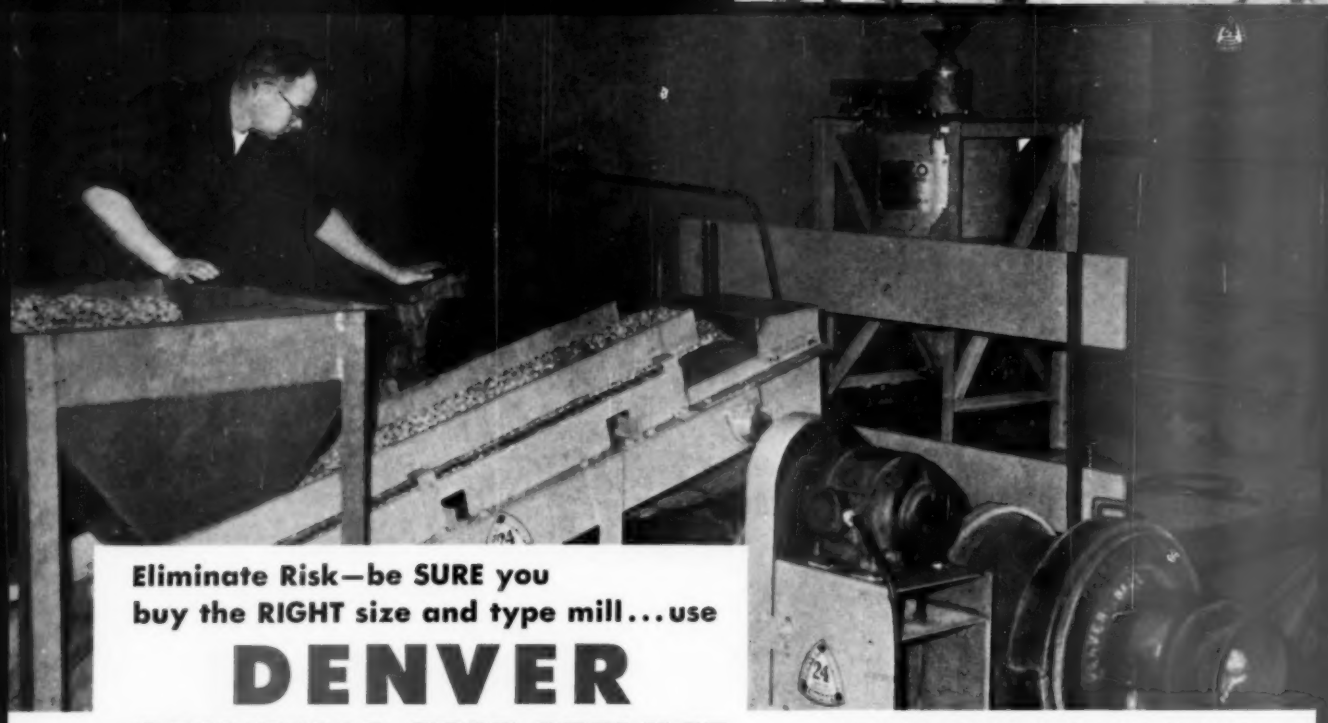

Eliminate Risk—be SURE you buy the RIGHT size and type mill...use

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GRINDING TEST SERVICE

Before you invest in a grinding mill, BE SURE! DENVER's completely equipped testing lab, backed by techniques and knowledge gained in more than 30 years of practical test and field experience, can give you a quick, economical and practical solution to even the toughest of grinding problems *before you get into* production!

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Batch or Pilot Tests
BALL MILL—wet or dry, grate or overflow discharge.
ROD MILL—wet or dry, overflow or peripheral discharge.

Open Circuit Grinding

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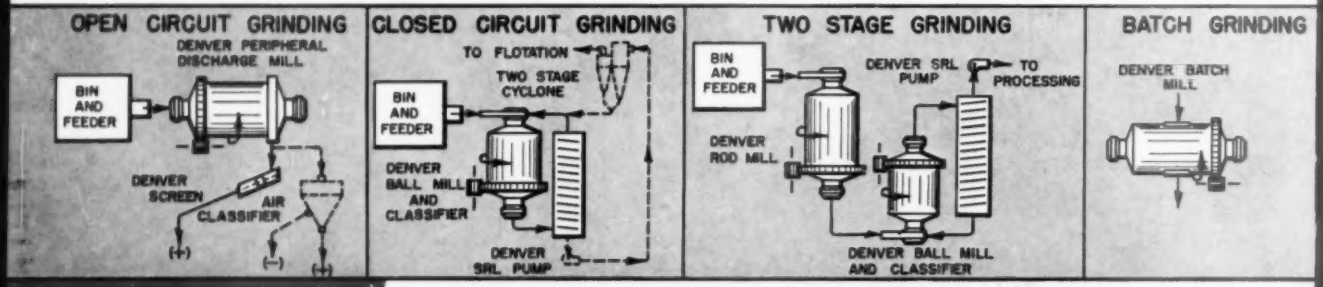
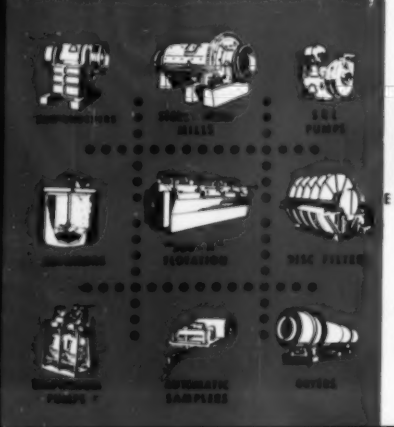
Preliminary Examinations made without charge. Flowsheet studies and technical bulletins are available on request. Write today.





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Lasts twice as long— not one repair in 10 years

B.F.Goodrich cord belt stands impact, carries heavy loads further

TONS of sand and gravel dumped on that conveyor belt are carried high into the air to a separator. Heavy loads like this wore out an ordinary belt in 5 years, but this B.F.Goodrich cord belt has already lasted almost 10 years without one repair and practically no maintenance—and it still looks good for several years more.

The ability to stand heavy impact and carry heavy loads long distances is built into the B.F.Goodrich cord belts. Cords running lengthwise, without cross threads binding them together, are surrounded by rubber. They are free to "give" on impact, with rubber taking the shock. Because of this flexibility, the cord belts conform to idlers, pulleys. Spillage is reduced, troughing is natural and belts keep centered on idlers, sustain less damage, require less maintenance.

Good as the record is on the belt in the picture, chances are that it will soon be bettered because of the improvements that are constantly being made in B.F.Goodrich Nycord belts. In recent years, for example, the use of improved rubber compounds and stronger fabrics has resulted in cord belts that last even longer, carry heavier loads, stand even more pounding.

Any conveying operation that submits a belt to punishing impact at loading chute, heavy loads with long centers and high lifts can use B.F.Goodrich cord belts. Your B.F.Goodrich distributor can give you full information. *B.F.Goodrich Industrial Products Co., Dept. M-522, Akron 18, Ohio.*

B.F.Goodrich *conveyor belts*

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Enter 1030 on Reader Card

FEBRUARY 1959

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FEATURES

DEPARTMENTS

ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 79 W. Monroe St., Chicago 3, Illinois; P. D. Allen, President; Copyright, 1959, by Maclean-Hunter Publishing Corporation. Second-class postage paid at Chicago, Ill. and at Long Prairie, Minn.

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TELSMITH

designed and equipped

- **Equipment was quickly and easily installed.**
- **Compact, efficient plant meets all expectations and requirements of its owners—**

ONTARIO CUSTOM CRUSHING LIMITED
Brantford, Ontario

Designed to produce 150 tons per hour when making all minus ⅞″ aggregate—this modern, compact Telsmith plant can make all sizes of washed sand and gravel for construction requirements, including minus 1¼″ plus ⅞″, minus ⅞″ plus 9/16″, minus 9/16″ plus 3/16″, minus 3/16″ sand.

Telsmith Equipped Throughout—CRUSHING UNIT: 30″ x 5′6″ Standard Duty Plate Feeder • 5′ x 12′ Double Deck Vibro-King Scalper • 13-B Gyratory Breaker • 48-FC Gyrasphere Secondary Crusher. WASHING-SIZING UNIT: Two 5′ x 12′ Triple Deck Vibro-King Sizing Screens • 24″ x 19′ Twin Screw Sand Classifier • 24″ DorrClone Classifier.

All plant equipment was furnished by Ontario Equipment & Supply, Ltd., Telsmith Distributor, Toronto.

Send for Bulletin 266

Close-up of Crushing Unit showing Telsmith Vibro-King Scalper, 13-B Gyratory Breaker, and 48-FC Gyrasphere Secondary Crusher.

G-30

Airview of complete operation by Photographic Survey Corp. Ltd.

SMITH ENGINEERING WORKS

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The LINK-BELT idler line for mining . . . now

EVEN BROADER! EVEN BETTER!

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For general conveyor service, maximum loads of 100 lbs. per cu. ft.—moderate lump sizes. **Designed for conveyors carrying medium loads or for installations requiring intermittent operation. 14- to 36-in. belt widths. Available with greaseable or factory-sealed precision type ball bearings.**

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For continuous operation . . . high capacities . . . heavy-weight, abrasive materials. **18- to 48-in. belt widths. Equipped with precision roller bearings.**

SERIES 8000

For continuous operation . . . higher capacities . . . heavier-weight, abrasive materials. **24- to 60-in. belt widths. Equipped with precision roller bearings.**

Link-Belt introduces many new types and sizes . . . new features, new numbers

Yes, Link-Belt's newly expanded line permits selection of a belt conveyor idler that matches handling requirements more exactly than ever before. And design improvements have created manufacturing efficiencies that contribute to our ability to offer a quality line without added cost or price premiums.

Ranging in application from light-weight materials of less than 100 lbs. per cu. ft. to such heavy ores as copper and iron, Link-Belt idlers are made for a broad range of belt widths, with rolls of various diameters, materials and coatings. This broad coverage avoids wasteful over- and under-engineering . . . permits "pin-pointing" that results in substantial savings in purchasing and maintenance.

For further facts on this new, expanded line—contact your Link-Belt office or stock-carrying distributor. Look under CONVEYORS in the yellow pages of your phone book. Or write for new Catalog 2716.

LINK-BELT

BELT CONVEYOR IDLERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 4,377

SERIES 9000

For continuous service . . . highest capacities and coarsest materials. **36- to 84-in. belt widths. Equipped with heavy-duty precision roller bearings.**

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NORTHWESTS
money makers in ROCK!

This is no advertising boast! You can check it in dozens of places. It is the big reason why so many quarries, big and little, from coast to coast use Northwests.

This Model 6, 1½-yd. Northwest is in the big quarry of the Algood Limestone Co. at Algood, Tenn. The machine handles agricultural lime stone and aggregate from a 100 ft. face.

This is the second Northwest Algood Limestone Co. has owned—another repeat order that testifies to the high quality of Northwest performance.

Like all Northwests the Model 6 is a *real* Rock Shovel —no stutter—no restarts—no dipper juggling.

The Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste. It's a clean cut through the bank without delays or restarts. Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting smooth and easy, reducing spillage. The "Feather-Touch" Clutch Control takes the heavy work out of throwing drum clutches without resorting to compressors, pumps, valves or other delicate mechanisms. Northwest Steering reduces the delays of relocation. These are just a few of the advantages that have put so many Northwests in gravel pits all over the country. They help to assure maximum crusher production!

Why not find out why so many contractors and gravel producers in the country have bought Northwests again and again. Let us give you the full story.

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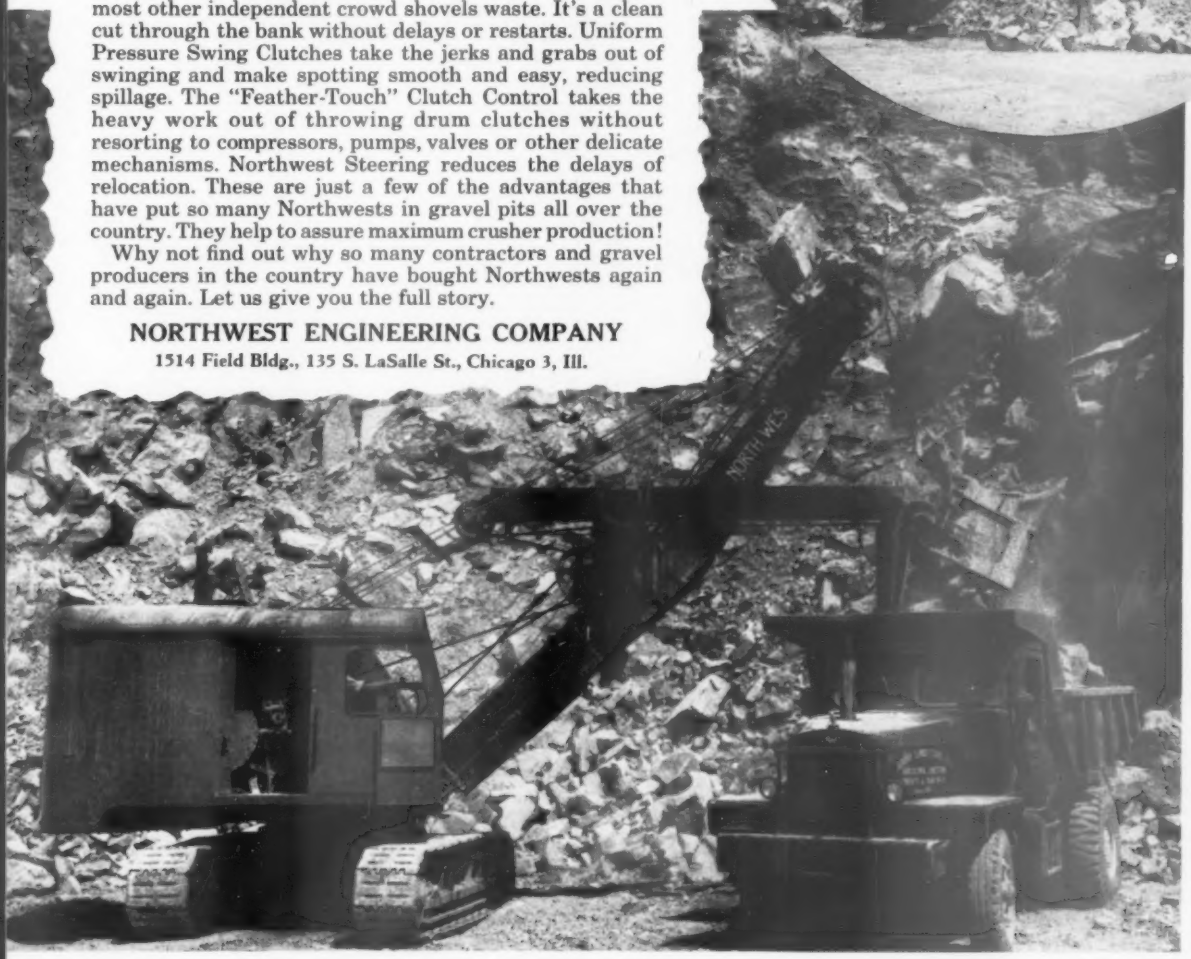

5-6-16-S

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SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
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Now prove in your own plant the efficiency, plus substantial savings offered by rugged Coates Carbex Grinding Balls. Make the same test we recently concluded in our continuing research to improve our product. A revolutionary new scientific technique was used to accurately identify balls with invisible markings. Several types of balls were marked and charged into a cement finishing mill. After thousands of gruelling hours, 98 per cent of the test balls were recovered. Laboratory examinations disclosed that Carbex Grinding Balls showed little wear, and on a true cost basis were a much better buy that balls which performed slightly better but cost ten to twenty times more.

Continuing research conducted by Coates has developed a low cost, high performance product. Carbex Triple-Forged Grinding Balls are rounder for better wear, harder for more efficient grinding, tougher to withstand stress. Grind better for less with Carbex Balls, proven your best buy.

CS58-3

Write for prices . . . All sizes—½" to 5" carried in stock for immediate shipment.

COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

COATES STEEL PRODUCTS CO.

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

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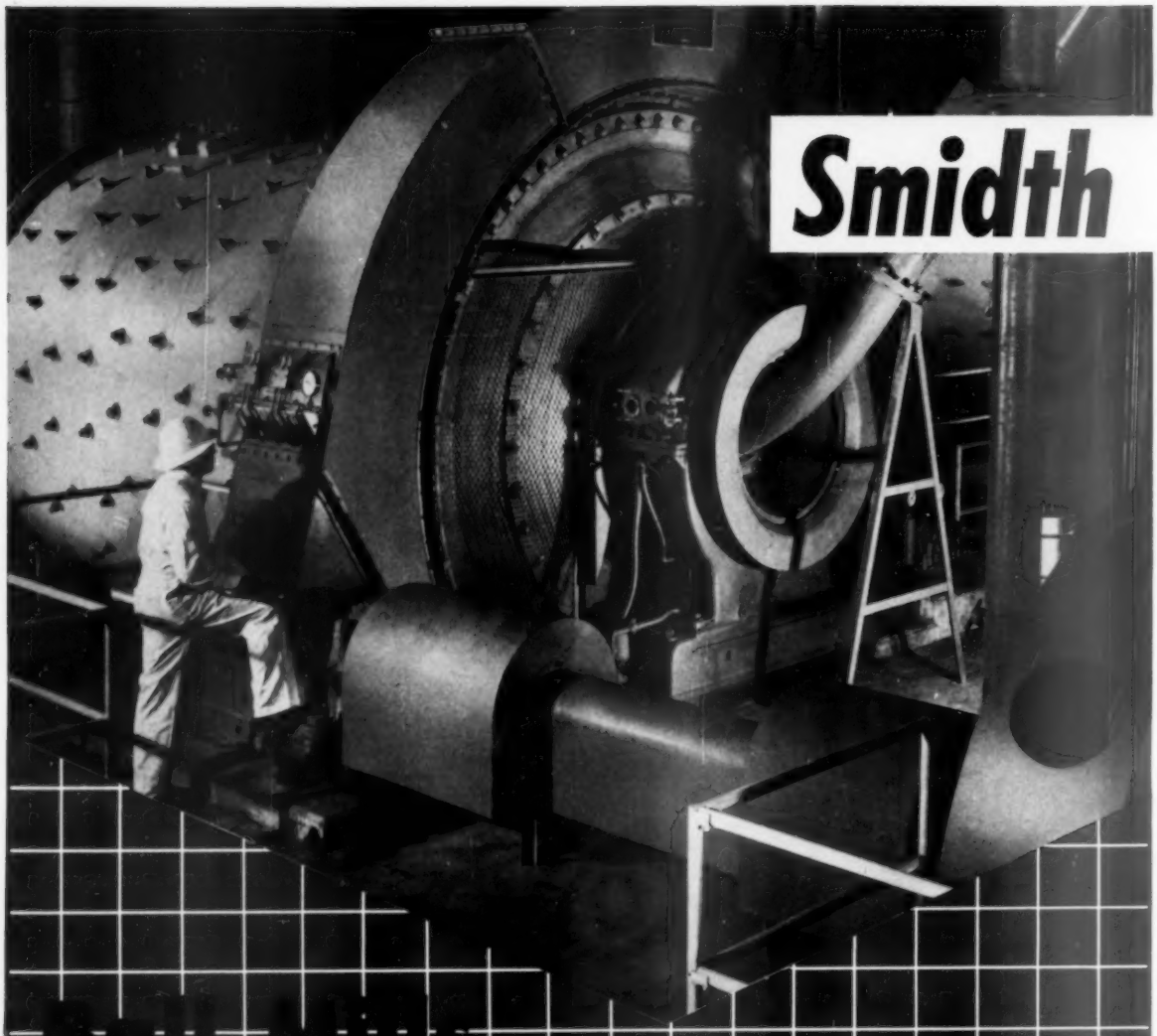

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What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

February, 1959

Resourcefulness is paying off in customer safety and good will for Marble Cliff Quarries Co., Columbus, Ohio. Consulted by the Port Columbus airport to solve landing difficulties in icy weather, the rock producer had this directive: Find a material to insure clean runways and sufficient traction. Ordinary sand was ruled out as being too smooth, rolling up in front of the braking wheels. Marble Cliff manufactured a sand from its crushed hard blue limestone, and recommended that it be applied during afternoon thaw when it could sink into the surface and become embedded. The company also came up with a solution for days when temperatures remain below freezing—hook a standard weed-burner behind a truck and spread stone sand and melt the runway surface at the same time. Flames from the weed-burner thaw the ice sufficiently for the sand to sink in.

More companies are taking to the air to inventory stockpiles of coal, sand, gravel and other bulk materials. (See What's Happening, October, 1958.) **The Wall Street Journal** reports that Lockwood, Kessler & Bartlett, Inc., Syosset, N.Y., is taking aerial inventories of coal supplies for Consolidated Edison Co. of New York, sand and gravel pits of a Long Island producer and a government-owned strategic metal ore stockpile in West Virginia. The firm figures the quantities of materials by subjecting aerial photos to three-dimensional interpretation. An important part of their method is analysis of data by electronic computer, a factor responsible for greater speed and accuracy, according to Ford Bartlett, president.

In another area—highway engineering—the value of photogrammetric services is being stressed. Michigan State Highway Department estimates that it saved more than $1 million last year in a stepped-up use of such services. The department says that application of photogrammetry reduces the average surveying cost to about $40 per mile, and time from weeks to hours. Five hundred miles of highways designed through photogrammetric methods are in various planning stages.

Chemcrete is the name given to a new "chemical concrete"—actually a surfacing material combining pigmented aggregate with an epoxy resin. Made by Protex-A-Cote, Inc., the topping is applied by trowel before screeding to desired thickness. Conversion and cure are said to be effected in 12 hours at room temperature, and no sealer is required. The new product is being marketed in a variety of colors for application to floors, sidewalks and roadways. It is abrasion and chemical resistant.

Taconite tailings are being tested as a highway construction material in Minnesota. The State Highway Department, interested in using the tailings for this purpose, has secured 50,000 cu. yd. from Reserve Mining Co.'s Silver Bay taconite operation.

A new explosive still in early stages of development is an aqueous slurry of ammonium nitrate and TNT, reported in **Chemical and Engineering News.** It has been used for open pit blasting at Iron Ore Co. of Canada's Knob Lake operations in Newfoundland. Canadian Industries Ltd. developed the explosive in collaboration with the inventors, M. A. Cook of University of Utah and H. E. Farnam of Iron Ore Co. of Canada. Density is 1.4 gm. per cc.; it can be loaded under water, and strength compares to that of 70-percent gelatin dynamite. However, it is less sensitive. A high explosive primer is required.

Drivers of the 60 test vehicles being used in the AASHO Road Test near Ottawa, Ill., are being supplied by a 300-man force from the Army Transportation Corps stationed at the site. The vehicles, with axle loads ranging from 2,000 to 30,000 lb. on single axles and 24,000 to 48,000 on tandem axles, are running on five loops of the pavement 18 hours a day, six days a week and will continue to do so until the two-year test is completed. A sixth loop, carrying no traffic, is intended for special studies of deflection and strains and evaluation of effects of weather on pavements. In this study, aimed at amassing "statistically unassailable" data, construction of pavements was more rigidly controlled than any ever attempted in large-scale highway operations. The six test loops have been built of some 180 different combinations of materials and thicknesses scattered through 836 sections of pavement.

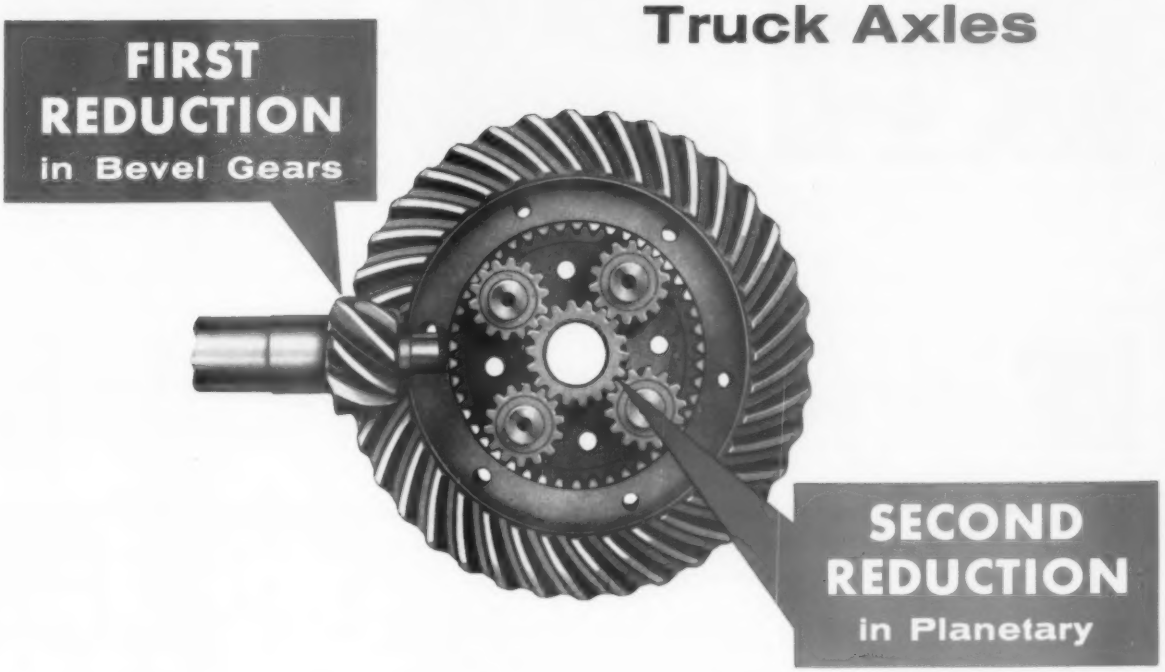
Innovations in explosives have been noted. One of these is Imatrex, discussed in a recent issue of **Mining World.** Imatrex, developed in Finland and Sweden, is a potassium chlorate with practically uniform porosity. It becomes a blasting agent only after impregnation with a suitable combustible oil. Bulk density is high, so that energy content per unit volume of charge space is comparatively large. Imatrex is noncombustible, insensitive to heat and cold, and water-soluble; the explosive and its gases reportedly are odorless and leave no physical ill effects.

Synthetic quartz crystals, competitive in price with natural quartz crystals, are being produced in a pilot plant operation by Western Electric Co., manufacturing arm of American Telephone and Telegraph Co. R. A. Sullivan and R. A. Laudise, describing the process at a meeting of American Institute of Chemical Engineers, said that it uses very high pressure and high heat. The process actually grows the crystals from a feed stock at the rate of an inch in 16 days. Western Electric feels the process is important "to the communications industry since it can free it of dependence on the natural product," difficult to obtain from Brazil in adequate sizes.

Flat-bed trucks are turned into tankers by use of giant rubber bags that can carry from 1,500 to 25,000 gal. The bags are U. S. Rubber Co.'s Sealdtanks. Shippers about the country are using them as cost cutters which enable them to carry two-way payloads. Some of the products being hauled in bags: wine, molasses, glue, milk, vinegar, noncorrosive chemicals. Tests are still being conducted on types of cargo they can safely carry. U. S. Rubber has completed designs for a bag able to carry 500,000 gal. Such large bags probably will be used initially by the military for over-water towing and storage of liquid products.

The editors

A New Concept in Double Reduction Truck Axles



Eaton Planetary Double Reduction

Gives You these Important Benefits!

Save Weight—Size for size, Eaton PDR Axles weigh less than conventional herringbone or spur gear axles, permit truckers to haul more legal payload.

Last Longer—In Eaton PDR Axles, gear tooth loads are equally distributed over four rugged "planet" gears; stress and wear are reduced, resulting in materially longer axle life. Eaton's forced-flow lubricating system provides positive lubrication to all moving parts, even at slowest vehicle speeds—a feature not available in other double reduction axles.

Cost Less to Maintain—When and if repairs are necessary, parts are readily available—most of them interchangeable with other Eaton Axles. Simple construction—similar to the famous Eaton 2-Speed Axle, with which all truck service men are familiar—holds maintenance labor to a minimum.

Previously, double-reduction axles have been available only in the extra heavy-duty sizes. Eaton PDR Axles are available in a wide range of sizes—the last word in equipment to meet the demands of today's hauling conditions. By actual comparison they cost less to buy, less to maintain. They have established outstanding performance records in all types of heavy-duty operation.

EATON

Ask your Truck Dealer for Complete Information about Eaton PDR Axles

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

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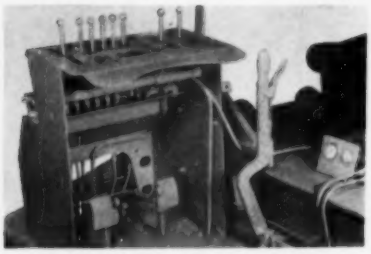
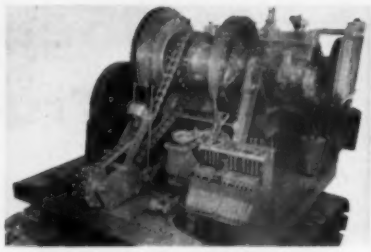
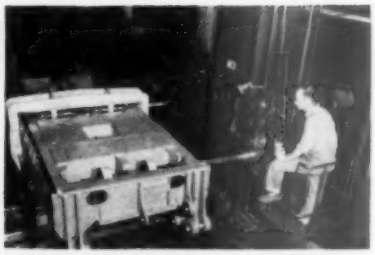
Six reasons why Link-Belt Speeder . . .



1. SPLIT-SECOND FINGERTIP CONTROL — Exclusive Speed-o-Matic power hydraulic controls put a K model through its paces at a flick of an operator's wrist . . . minimize fatigue . . . encourage high production throughout the shift.



2. BONUS USABLE HORSEPOWER — The extra strength built into load-carrying components permits K models to take full advantage of the engine's available horsepower and still remain well within engine manufacturers' recommended speeds.



3. PRECISION ALIGNMENT TO CUT MAINTENANCE — Close-tolerance machining, including jig line boring (above), means closer fits . . . less chance for eventual misalignment . . . no need for shims . . . better parts interchangeability.

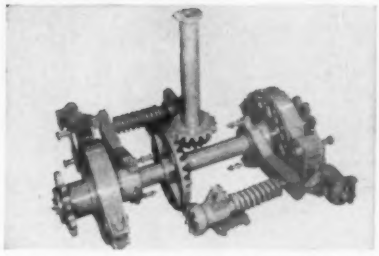
King-size K models

Here's how the 1¾-yard K-370 Series is tailored to today's economy . . . why it's a better buy than any 1½-yard shovel-crane . . . more practical to use than many 2-yard rigs

In comparison with 1½-yard machines, the 1¾-yard K-370 offers much more than just a 16% advantage in bucket capacity. It's fast, easier handling . . . exceptionally maneuverable and easy to transport. It boasts the top usable horsepower in its class . . . even outrates some 2-yard rigs.

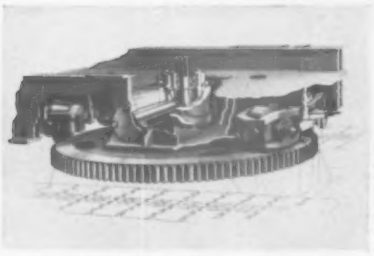
For the complete story, see your distributor or write for the new 20-page catalog, No. 2727.

LINK-BELT SPEEDER CORP., CEDAR RAPIDS, IA.



4. EXCEPTIONAL ON-THE-JOB MANEUVERABILITY—Traction mechanism features hydraulic power steer. This, plus high speed power shifting, makes K models great for work in tight quarters. No time wasted to manually engage jaw clutches.

5. EASY JOB-TO-JOB TRANSPORTABILITY—Any K model can be readied for lowboy or rail car transport in short order. Crawler side frames, counterweight and attachments can be removed to meet weight or width restrictions.



6. NO BINDING STRESSES ON CENTERPIN OR ROLLERS—Exclusive centerpin trunnion and oscillating conical roller design eliminates concentrated centerpin loadings . . . prevents shearing or bending . . . minimizes wear.

deliver bonus output

And here's why the 3-yard K-608 series outmaneuvers smaller rigs . . . often outproduces bigger machines

The K-608 has created real excitement wherever it has been used. It's so fast, so easy to handle, so powerful!

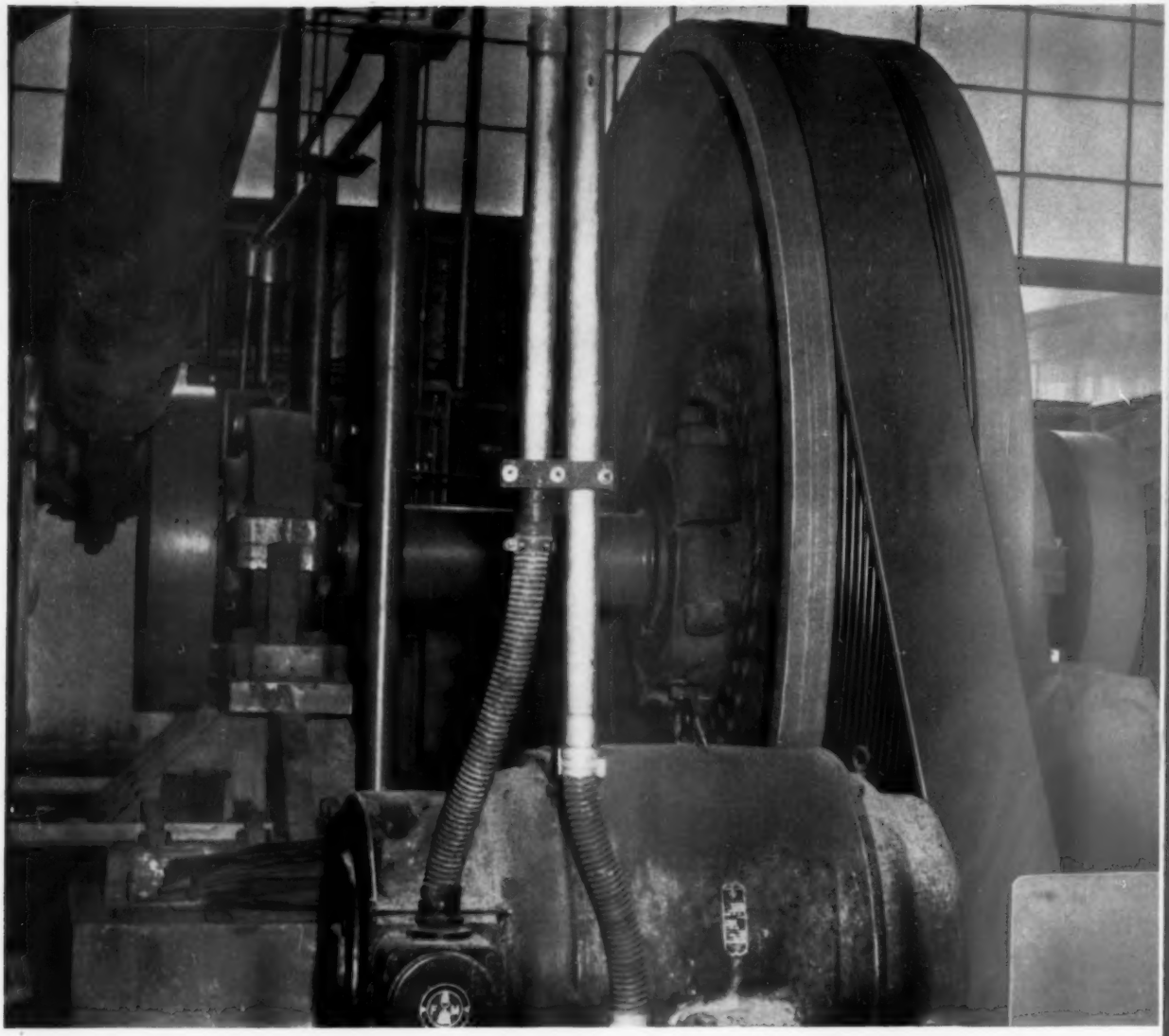
And no wonder—with Speed-o-Matic controls, power shift, power steer and many other features, the K-608 wheels through cycles at a speed you'd expect only from smaller rigs. The K-608 features an engine-torque converter and tailshaft output governor combination as standard equipment. The result—ability of engine power to adapt to load requirements . . . no chance for engine stalls.

For all the facts, see your distributor or write for the new 20-page catalog, No. 2710.

14,008

LINK-BELT SPEEDER

It's time to compare . . . with a Link-Belt Speeder



R/M POLY-V® DRIVE . . . MORE POWER—LESS SPACE

. . . "More Use ~~per~~ for Your Dollar"

Patented new design makes the difference! A single, endless, parallel V-ribbed belt runs on sheaves specially designed to mate precisely with belt ribs . . . permits *narrower* sheaves to deliver *equal* power in as little as ⅔ the space of a conventional V-belt drive — or up to 50% *more* power in the *same* space! There's *less shaft overhang . . . less drive weight . . .* "*More* Use per Dollar" with R/M Poly-V* Drive.

Just *two* Poly-V belt cross sections meet *every* requirement for heavy duty power transmission.

OTHER ADVANTAGES

- **Eliminates Multiple V-Belt "Matching" Problems**
- **Reduces Wear on Belt *and* Sheaves**
- **Maintains *Constant* Speed Ratios, *No* Load to *Full* Load**
- **Cooler, Smoother Running**
- **Reduces Belt and Sheave Inventories to a *Minimum***

Write for Bulletin #6638 . . . or discuss the advantages of new R/M Poly-V Drives for *your* applications with an R/M representative.

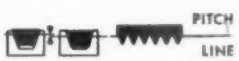
*Poly-V is a Registered Raybestos-Manhattan Trademark

HOMOFLEX HOSE — Rugged, easy handling flexible construction for use with air, water, other fluids and gases. Mandrel-made . . . uniform diameter, no preset twist. Coils and uncoils *freely* in *any* direction. Takes high pressures and surges with wide margin of safety. Homoflex Hose does a *better* job . . . and *lasts longer*. Write for Bulletin #6879.

RAY-MAN CONVEYOR BELT — Engineered for long life on tough hauls. It is tough, flexible, resists gouging and tearing. Has high fastener holding ability . . . requires no breaker strip. Other R/M belt types available for all bulk materials handling conditions. Write for Catalog 25CB. Below: World's longest one-piece conveyor belt leaves R/M plant for large mine installation.

R/M POLY-V® DRIVE

50% LESS OVERHANG
For less drive weight, less space



UNVARYING PITCH DIAMETER
Poly-V cannot sink into grooves under shock load

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

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MACWHYTE WIRE ROPE

Wire Rope made for a purpose—to serve you better

EDITOR'S PAGE

George C. Lindsay, Editor

Something has to be done about depreciation

LACK OF REALISTIC LAWS to cover the depreciation problem has put a financial millstone around the neck of your business. It's time you face up to the problem and demand relief through the proper legislative channels. Some already have, but more help is needed from all.

The big, bold culprit that caused the problem is inflation—a gradual wearing away of dollar purchasing power through the rise of prices in general. Some areas are not bothered as much as others—real estate and stocks, for instance—because value in those lines normally increases with the upward movement of the general price level.

But Congress' unrealistic attitude toward the depreciation problem has cost you big money—right out of your earnings pocket. Lack of proper allowances for depreciation creates one of the biggest indirect taxes you have. It applies to your business, regardless of what it is, if you use equipment that wears out or becomes obsolete.

Let's be specific. In 1928, a cement company built a 1-million-bbl. a year plant for $3 million. It had a 30-year life. Legally, the company could put away $100,000 a year, for depreciation allowances, and it did. This was to provide for replacement of the assets at the end of their economic or useful life.

But what a shock to the pocketbook the company received when it built a plant to replace the production capacity of the old! In 1958, a new plant of comparable size called for a $12-million investment.

Inflation, plus inadequate depreciation allowances over the period, cost the company a cool $9 million. We say it came out of earnings, for we think that's where most of it came from.

A similar example could be applied to any business—yours included. We've posed the problem. It's not a new one, but one getting more serious every year something isn't done about it. But we can't provide the specific answer in the form of a suggested legislative revision. We'll leave that to the experts in Washington.

But they won't act unless you let them know that lack of action is reducing your ability—and the nation's—to grow. We suggest you get a letter off to your Congressional representative right away.

We did.

In 3 years, 1¼ yd Michigan loads 300,000 yds of rock. Yet...

REPAIR COSTS TOTAL $18.45

In studying most efficiency reports, you have to remember one extremely important fact: that the data given usually cannot legitimately be applied to machines now available. Changes galore—for good or bad—have been made since the veteran unit was built. That is why this report seems to us so significant. The Michigan Tractor Shovel described is in every important component EXACTLY like the Michigans made today. In fact, all 8,000 Michigan Tractor Shovels built have been like the first one—a tribute to the efficiency of design and efficiency of their all-Clark designed and built power trains.

For the past three years, Yaquina Head Quarries, Newport, Oregon, has used this Model 75A Michigan Tractor Shovel 6 to 8 hours a day, 5 days a week, truck-loading crushed rock. The machine has handled over 300,000 yards of material, ranging in size from ¼" to 4" minus.

Its only downtime in all these months has been for changing points and plugs, and for replacing two emergency brake cables.

The work took less than 30 minutes and parts cost exactly $18.45.

For this superb record, credit belongs partially to excellent machine design and construction . . . partially to Plant Supt Virgil Landess' insistence on a simple, regular, preventive maintenance program. The Michigan is greased every day. Rear end and torque converter are checked twice a week. Oil is changed every 40 hours, filters every 80 hours, and a one-hour maintenance check made every two weeks.

"Cheap insurance for keeping an excellent machine excellent," says Quarry Owner Roy Sawyer.

Stock-piles at the Yaquina Head quarry are located in a quarter-mile semi-circle around the crusher, on two levels. Good brakes, excellent visibility, 26 mph speed, fingertip power steering combine to cut travel time between loading locations.

Material—after shooting, secondary shooting, crushing, and normal 2½-to-1 swell—weighs 2600 to 2800 lbs per yd. Mostly basalt, tests show a very small percentage of iron in the rock. Assays have picked up gold, too—80c worth per ton.

Steep 20% grade between stockpile levels proves no problem for the powerful four-wheel-drive Michigan—even in wet weather.

Among the many odd jobs done by Yaquina Head's quarries mobile Michigan Tractor Shovel: moving a 4,000 lb crusher head.

Loads typical truck in one minute

The 80 hp Michigan speeds all kinds of scattered assignments. It lifts crusher heads, for example. Picks timbers. Sets motors. But mostly it loads trucks. "Everything from pickups to 15 yard semis with 8 ft high sides," describes Owner Sawyer. A typical 5 yard truck is loaded in four bucket-fulls. Time: 1 to 1½ minutes.

Reduces truck waiting time 80%

Fast loading—plus fast travel between the nine stone stockpiles—has cut truck waiting time to practically zero. "In the old days—when we handled loading with a ¾ yard rubber-tired machine of another make—trucks often had to wait 10 to 15 minutes each for loading service," remembers Mr. Sawyer. "That old machine couldn't load out more than 250 yards a day. Our Michigan easily loads 400 to 500 yards a day. And it *has* loaded as much as 835 yards (in 8 hours)."

Eight models now available

How do your production requirements compare? If they're the same (or less), your most economical bet for the job probably would be a Michigan 1¼ yard all-wheel-drive model (like the machine described here). For greater output, you have a wide choice of bigger machines with 2, 2¼, *and the new 4 or 6 yard buckets* (standard SAE measure). For clean-up around crushers and belts, there's a 16 cubic *foot* size. Eight standard models in all. See your Michigan Distributor for details.

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road
Benton Harbor 7, Michigan
In Canada: Canadian Clark, Ltd.
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ROCKY'S NOTES

NATHAN C. ROCKWOOD

ASTM called "vortex" of our institutions

AFTER A LAPSE OF SEVERAL YEARS it was the good fortune of this writer to attend the recent meetings at Purdue University, Lafayette, Ind., of the American Society for Testing Materials' Committees C-1 and C-9. These are the technical committees concerned with cement, concrete and concrete aggregates. For almost 40 years we were regular in our attendance. It was decided it should prove interesting and instructive to renew old friendships and acquaintances, and to observe what progress had been made during the lapsed years. The former objective was indeed enjoyable, but the latter did not disclose anything especially noteworthy. However, that was to be anticipated from the very nature of this organization.

Year after year we have listened to pretty much the same discussions, and we have done considerable philosophizing as to what it all meant, or what was being accomplished. From this one meeting we got a new slant on ASTM and we feel sure many others did, after listening to a sprightly after-luncheon address by Dr. A. Allan Bates, vice president in charge of research of the Portland Cement Association and a vice president of ASTM. His subject was "ASTM—democracy in action"—and he did full justice to it. The occasion was also notable as being presided over by Prof. K. B. Woods, head of the school of civil engineering, Purdue University, and president of ASTM—a rare honor to have both the president and vice president at a regional committee meeting.

Dr. Bates reminded us what democracy is and where it originated—in ancient Greece, or in Athens in particular. He quoted from the famous Athenian orator and statesman, Pericles, telling the Athenians how to maintain their freedom and democracy, and by paraphrasing some few sentences showed how well those same injunctions to the ancient citizens of Athens apply to all of us today, with ASTM as the prime example or "vortex" of democracy in action. Since our democracy in America is so intimately associated with our scheme of economy and industrialization, and ASTM, because of its influence, contacts and involvements with practically all industry, is indeed an example of the practice of peaceful, progressive compromise and diplomacy—and of acceptance by every citizen of his individual responsibilities—it is democracy in action.

As Dr. Bates explained, a literal translation of our word "civilization" means living in cities. When mankind abandoned primitive rights and concepts of freedom to live in communities with other human beings, or became socially minded, he had to surrender some of his primitive ideas in order to live at peace with his fellow citizens. This meant he must learn to compromise his differences instead of resorting to force to settle them. Thus intelligent compromise is the key to civilization and of the continued success of any democratic form of government.

ASTM is an outstanding example of democracy in action because it is a society composed of individuals representing competitive elements in our civilization—users and producers of engineering materials. The selfish interests of its members, as representatives of these opposing groups, are often in conflict; yet, being intelligent and honest citizens they are ready to compromise their differences in order that the arts and sciences they represent may advance for the good of all. Unless we Americans all absorb some of the lesson of this example and maintain free and open minds, we face the same dangers and hazards that destroyed the Greek democracies of 2,500 years ago, and have destroyed all forms of democratic government in many countries since.

Please turn to page 146

Four Michigan Tractor Dozer models are now available . . this 165 hp size, 262 hp, 335 hp, 600 hp.

Rock quarry cuts repair bills 60%

Company records show rubber-tire Michigan Dozer also has reduced cleanup time 50% over track-type machines

"Like many other stone quarries, we sure used to be unhappy about track maintenance," says G. E. McLeer, vice president, Ohio River Stone Co, Prospect, Kentucky. "Rails alone used to cost us hundreds of dollars per year for replacement . . . plus several man-days of labor per change. No more. Our rubber-mounted Model 180 Michigan Tractor Dozer has run a year now. Naturally, no track problems . . . and no tire replacement either. Looks like original treads will last another year easily. Then, we expect to recap . . . and repeat recap. The savings should be at least 60%."

Excellent performance of Michigan Tractor Shovel echoed in Dozer

"Track wear wasn't the only reason we changed over," McLeer continues. "We chose the Michigan *Dozer* because of our excellent experience with our three Model 175A Michigan Tractor *Shovels*. Their all-Clark power trains really stand up. The Dozer's power train does, too. In its year of operation, the dozer has lost maybe 25 working hours—but that's all!

¼ mile move takes 2 minutes

"Production was another of our aims. The Michigan gets around much faster than the crawlers. In emergencies, for instance, we drive it the 20 miles between our two main quarries under its own power. After all, it's got a top speed of 27 mph, with good visibility, good brakes and power steering.

"Moves in any one quarry aren't nearly as long, but they're virtually continuous. Typical ¼-mile trip takes only 2 minutes . . . half to a third of crawler time. And, of course, the saved minutes go into productive work so necessary with increasing production demands.

"Our time studies show the rubber-tired Dozer *moves more material* on almost all jobs too — 50 per cent more when dressing stockpiles than a track-type machine. The reason? The Michigan moves *just as much* with its 10-foot dozer blade *per load*, yet *moves more loads per hour*. Speed advantage is mostly in faster backup, faster shifting. You don't have to stop to change speeds; just move a short-throw lever. No foot-clutching is necessary, ever."

Jack-of-all-jobs

Michigan Model 180 Tractor Dozer is "work-horse" of the main Derby Company quarry. Unit:

1. Takes about ½ hour to clean quarry floor after each shot.
2. Three to four times a day cleans up around two shovels: one on rock, one on stripping. Total work time, about 1½ hours per day.
3. Once a day, cleans spillage from 2 miles of truck roads.
4. Cleans spillage under crushers and aggregate bins.
5. Shapes nine rock stockpiles.
6. Cleans rock and dirt after stripping and before drilling.

Distributor service praised

"If any of our Michigans go down, we call our distributor (Emmett C. Watson Co of Louisville), and his men come right out," says McLeer. "Very seldom do we have to wait for parts and we get good warranty service."

You can get the same fast, low-cost help from *your* Michigan Distributor. Their good service is an important reason for the sale of over 8,000 Michigan rubber-tire units since 1954. Call them soon . . . they're good friends to know.

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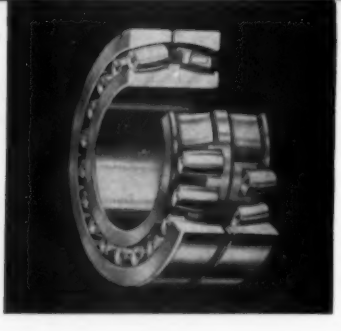

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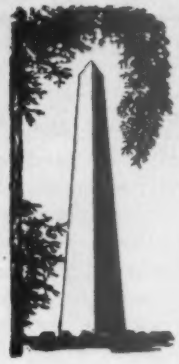

Washington Letter

Edgar Poe

New office Set up By BPR

With urban development and redevelopment requiring land in amounts little short of sensational, more and more states are establishing urban planning sections. Recognizing the growing importance of urban growth and its attendant problems for community governments, the Bureau of Public Roads has set up a new division in the office of engineering. It will coordinate the urban highway and interstate system development with urban master transportation and land use planning.

Opposition is cropping up left and right to the proposed federal tax increase on gasoline. Several states are proposing to raise the state gasoline tax to meet the increased costs of the expanded highway construction cost. The current federal tax is 3 cents a gallon. The average state tax is about 6 cents a gallon.

Mines Bureau Making sand, Gravel study

The Bureau of Mines is expanding its long-range studies involving the field of aggregates because of the growing demands for construction materials for highways and new buildings. The bureau is currently studying literature and field surveys of occurrence and distribution of sand, gravel and crushed stone, and other heavy aggregates.

The study is presently centered on operations in East Tennessee, Minnesota and Iowa, but will be expanded into other states in the future. Special attention is being devoted to costs, equipment, man-hour requirements, capacities, product quality, waste disposal, specifications, markets, and local restrictions of plants producing aggregates.

The bureau at various quarries is researching explosives, methods of fragmentation and vibration problems. The research is designed to aid production efficiency and more accurately measure and determine the effects of blasting vibration. In one phase of the research, studies of the mechanics of rock breakage by explosives are being conducted by means of a special strain gauge developed by the Bureau of Mines. Research will also include local materials that may not meet specifications by themselves, but can be upgraded to meet specifications.

See building Growth era

More than $700 million was spent in 1958 for building 2,500 new food chain supermarkets and remodeling 1,800 older ones, but forecasts are 1959 expenditures will mark another record-smashing year. Each year, for years, retail food store sales have been rising. The estimated increase for 1959 is 6.5 percent.

The Associated General Contractors of America, the trade association of about 7,000 contractors, is convinced this country has started a new era of construction growth. A survey by the Association indicates that new construction stands a fair chance of reaching a record of $52 billion during 1959, as compared with $48.8 billion in 1958. The 1959 AGC estimates are slightly more conservative than those of the Departments of Commerce and Labor which forecast a 7 percent increase to a total of $52.3 billion.

Total construction is expected to run in the neighborhood of $70 billion. Both industry and government are predicting the construction of about 1,200,000 new homes in 1959 or an increase of about 40,000 homes over 1958.

States leap Road hurdles, Tallamy says

How is the Interstate Highway System shaping up, despite the acute need for more Interstate funds? Federal Highway Administrator Bertram D. Tallamy provides ROCK PRODUCTS with this answer: "While there is still some disparity in relative progress, most of the hurdles have been leaped and the states which have been trailing in the obligation of funds are closing the gap. I have no doubt that we are progressing toward the simultaneous completion

of the Interstate System in all the states in accordance with the mandate given us by Congress in the Act of 1956.

"The engineering shortage is pretty much a thing of the past, the question of matching funds has been resolved in many states and nearing solution in others. The contracting industry, as well as the suppliers of material and equipment are geared to meet all of the requirements of the program."

Industry may Not get tax Benefit aids

Congress may not act this year on proposals that would liberalize federal depreciation allowance on plant and equipment. Passage of legislation at the 1958 session authorizing a special tax write-off on productive items of limited value appeared to pave the way for a new era to aid hard-pressed, tax-plagued industry. Many industrialists thought Congress was going to provide a sounder approach to depreciation, and at the same time encourage them to spend more on modern, efficient machinery and equipment.

Now that the United States Treasury is in a serious predicament because of the huge upcoming deficit, Congressional observers are flatly predicting that the law-makers will do little to provide an incentive. Furthermore, the Congress as now constituted appears unlikely to give industry a tax break through freer rules on depreciation that does not provide a little lighter tax for the individual citizen.

Steel strike Looms ahead?

Possibility of a steel strike about the middle of 1959 could slow down in some sections the highway construction program, should a strike be prolonged. Congress approved the big program in 1956. The highways are requiring about a million tons of steel a year, and the amount is increasing. A record amount of steel for road building is predicted for the current calendar year.

Commenting on the possibility of a strike, the Institute of Scrap Iron and Steel in Washington says: "If they [customers] follow their usual patterns, chances are good they will increase their orders beyond immediate needs because of fears of developing shortages or slower delivery schedules. Meantime, the industry looks particularly for substantial growth in highway construction with its consequent important orders for wire mesh, reinforcing rods, culverts and structural steel."

Prefers Concrete For airstrips

The House Armed Services Subcommittee is standing behind the conclusions reached by the Army Corps of Engineers that flexible (bituminous) concrete is both feasible and competitive for use in noncritical areas of airstrips for the Air Force's heaviest bombers.

The United States Air Force, which previously had demanded rigid pavement for all airstrips, gave qualified concurrence to the Army Engineers following research conducted at the Columbus, Miss., Air Force Base.

The dispute involving the asphalt and portland cement industries first reached Representative F. Edward Hebert (D-La.) and his Armed Services Subcommittee over two years ago. In its concurrence, the Air Force said rigid concrete runways are preferable. However, where substantial savings may be chalked up, the Air Force said, it would be a "reasonable decision" to use rigid concrete in the critical runways areas, and flexible concrete for the noncritical areas.

Shale, clay, Slate plant Group grows

The Expanded Shale, Clay and Slate Institute, the trade association for the plants producing lightweight aggregate of shales, clays and slates by the rotary kiln method, is growing. Organized in 1952 with 11 plants, the institute began the new year with 36 plants, 28 in the United States, seven in Canada, and one in Australia.

An immediate goal of the institute is: Greater use of lightweight aggregate in construction of bridge decks. A substantial amount is already being used in bridge construction on state roads where traffic is considerably lighter than on the primary system.

New crushed Stone record

Probably a new record for crushed and broken stone production was established in 1958 over the record of 1957. However, it will be months before the Bureau of Mines will have all its reports in and releases its report. The record output in 1957 reached a high of 536 million short tons valued at $746 million compared with 504 million tons valued at $689 million in 1956. More than half the 1957 crushed and broken stone production was devoted to concrete and roadstone applications.

END

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Special Tools: Goodyear provides both hydraulic and hand tools especially made for off-the-road equipment.

Bond-a-Coat Finish: This protective coating affords long-lasting resistance to rust and corrosion.

If you have a rim problem, talk it over with the G. R. E. (Goodyear Rim Engineer). He'll save you time and money by helping you select the type and size of rim best suited to your needs. Write him at Goodyear, Metal Products Division, Akron 16, Ohio, or contact your local Goodyear Rim Distributor.

New Tru-Seal Rims—available in sizes 12.00 and up, including all earth-mover and grader sizes. This rim is similar to multiple-piece rims now in use—PLUS air-tight Tru-Seal rubber ring which compresses into sealing groove when tire is mounted.

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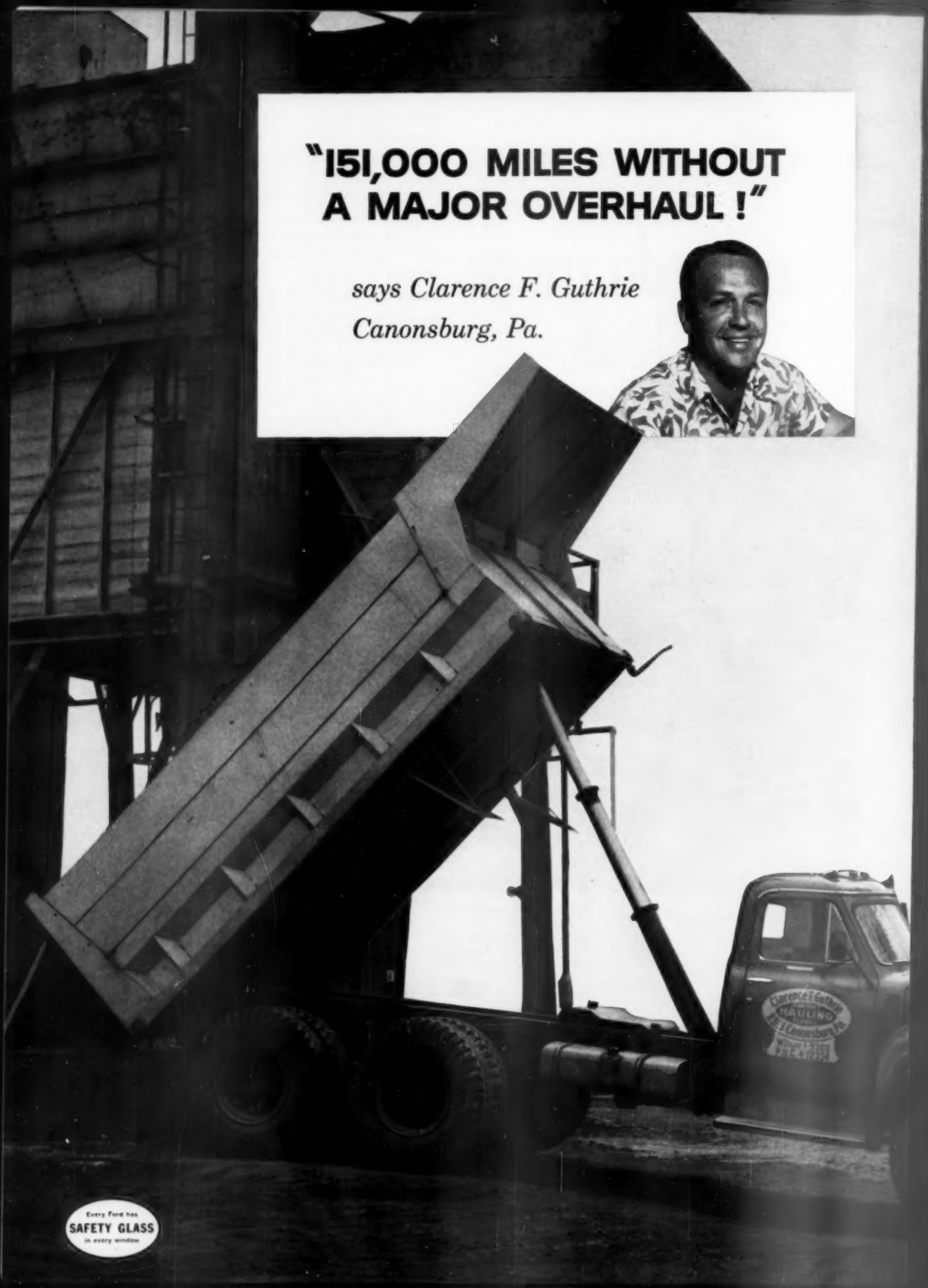
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in every window

"Ford's 332-cu. in. V-8 is the hottest thing on the road for its size!

"Our fourteen Ford trucks all have exceptional durability records. Several '55 T-800 dumps, grossing 48,000 lb., have over 200,000 miles on 'em. They went an average of 150,000 miles before we touched the engine. And for power and performance, too, the Ford 332 engine is the hottest thing on the road for its size.

"Ford's better visibility, handling ease and power steering are big factors in our excellent highway safety record. We've had many million-mile accident-free years with our Ford fleet.

"In addition to our sand and gravel business, we have ten Ford F- and C-800 tractors that make long, over-the-road trips hauling limestone one way and steel on the way back.

"On these trips parts availability is very important. Ford Dealers are about everywhere, and they all stock parts. We never get delayed waiting for Ford parts."

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NEW '59 FORD F-600 DUMP carries a maximum GVW rating of 19,500 lb. Now available with optional 6000-lb. front axle for greater capacity, longer life.

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Tuffy® Wire Rope Tips

Guard Against These Killers!

. . . Get The Full Measure of Service-Life Built In By Wire Rope Specialists

Mangled in a Wedge Socket

Here's a result of improper socketing. It was caused by using a poorly designed or worn-out wedge socket. Failure at the dead end can damage other sections of the rope, too.

Rusty Road to Ruin

Rust—No. 1 enemy of steel—takes a heavy toll in wire rope life. An insidious, silent type of killer, rust often does irreparable damage before it's even noticed. The one-strand break shown here resulted when the rope was allowed to become rust-bound through lack of lubrication. Tests show that, with other conditions ideal, properly lubricated rope has up to 10 times the life expectancy of dry rope.

Tuffy Balanced Scraper Rope

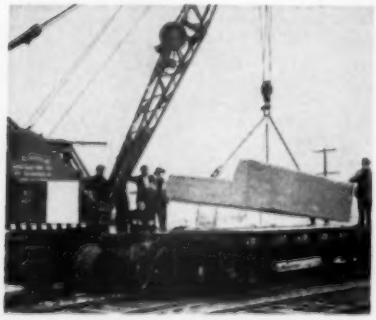
"Balanced" construction makes it flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Also gives higher resistance to the shock of load impact on slack line. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.

Overloaded — Soon Exploded

The rated capacity of a wire rope is based on the breaking strength (catalog) divided by a safety factor applicable to the type of service or use. The grade of steel, type of construction and size of the rope determine tensile strength. It must be properly related to the loads it will carry, or costly and dangerous early failures are likely to occur.

Victim of the Bends

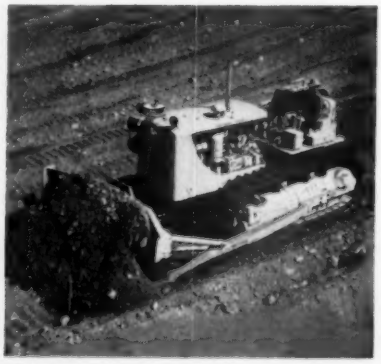
Excessive bending of wire rope accelerates wear. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bending tests, Union Wire Rope engineers have compiled data that you can use to assure getting the rope construction that will give you the longest service life. Ask about it.



Tuffy Balanced Slings & Hoist Lines

"Balanced" because they combine strength, flexibility and toughness in the proper relationship to do a better job longer.

Tuffy Slings and Hoist Lines are a top-performing team in every type of materials handling. The slings are made of a patented, machine-braided fabric that's next to impossible to knot or kink. The hoist lines are a special construction in which strength, flexibility and toughness are balanced.



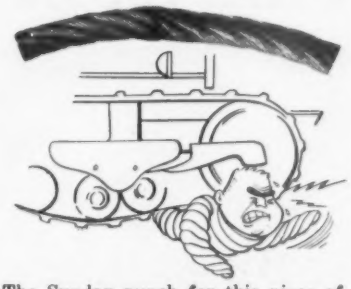
Tuffy Balanced Dozer Rope

Built to give you longer service with less downtime. Mounted on your dozer, a 150' reel of ½" or 9/16" can give you a big bonus of extra service. Here's how: when rope shows drum wear or is crushed on the drum, you feed through just enough to replace the damaged part. You save the 40 to 50 feet ordinarily thrown away. Also available in 300' and 500' reels.

Tuffy Balanced Dragline Rope

Here's highest abrasive resistance with super flexibility. Better spooling. Smoother riding on grooves. And Tuffy Dragline Rope hugs the drum when casting for full load. Gives you longer service life, consistent dependability, in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

Crushed by a Tractor Cleat

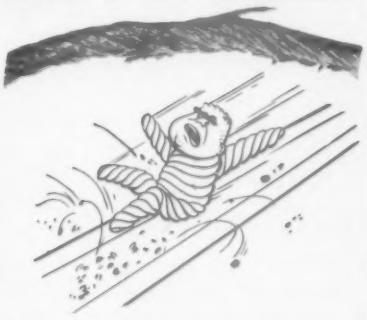


The Sunday punch for this piece of wire rope was delivered by a tractor cleat—just one of many crushing injuries caused by rope being run over or banged into by hard, sharp objects. Even the toughest wire rope is no match for this kind of mistreatment.

After a Suicide Jump

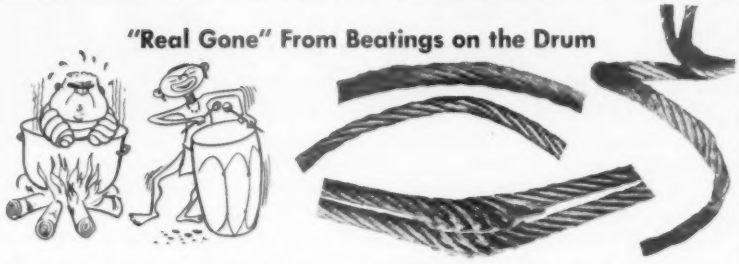
This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

Burned on a Frozen Sheave



End of the line came quickly for this rope as the result of operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope. Sheaves should be checked thoroughly and often.

"Real Gone" From Beatings on the Drum



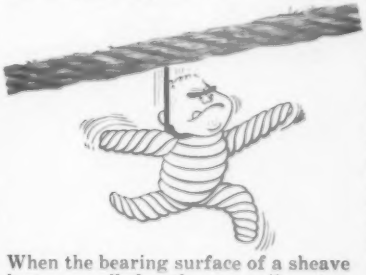
Even under normal operating conditions, drum wear gives wire rope severe punishment. This wear concentrates at the cross-over points and at the flange. Excessive drum crushing results from operating on small drums, excessive loading and poor winding. Smooth drums are not recommended. Here are typical "drum beatings": Cross-over wear; cross-over crushing on drum; drum crushing from poor winding; drum-crushing from small drum.

Although drum wear cannot be eliminated, its effects can be greatly reduced. Under properly engineered procedures, two and three times the service can be obtained from the same line by improving drum conditions. Union Wire Rope Engineers will help you with this problem. Get in touch with us for information.

On the "Blink" from a Kink

This open kink resulted from mishandling of rope. Guard against kinks by proper winding on the drum. Never pull a loop smaller. Always enlarge it, then straighten out the rope.

Strangled by a Misfit Sheave



When the bearing surface of a sheave is too small for the rope diameter, pinching action quickly destroys the rope — especially when it's overloaded. The victim shown here was knocked out in just 1½ hours of service.

Tuffy Wire Ropes are "Job Prescribed"—Each Designed for a Particular Type of Machine

There are thousands of wire rope constructions and Union Wire Rope specialists make them all. But, there is only one Tuffy line of wire ropes. Each Tuffy was developed and proved the one best rope for the particular work for which it is intended. It is designed as a functional part of the type of machine on which it is used.

Tuffy Wire Ropes are "job prescribed" and balanced in each prescription are all the ingredients of strength, flexibility and toughness to give you genuine relief from inefficient operation, foreshortened service life and safety hazards. You get longer service life and you cut down on your rope costs. Union Wire Rope Corporation, 2156 Manchester Avenue, Kansas City 26, Missouri.

Your Tuffy Distributor Can Help You Get The Full Measure of Service Life

C1

UNION Wire Rope

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Southwest Steel Products

Enter 1006 on Reader Card

WONDERWALL™ REDUCES

WONDERWALL is the great, new multiwall bag from West Virginia Pulp and Paper. WONDERWALLS outperform ordinary bags because they're made of Clupak* kraft paper that stretches. This Clupak paper enables a WONDERWALL bag to stand up under walloping impacts and manhandling punishment that break ordinary multiwalls.

Mr. W. T. Wyman, Purchasing Director of the Peerless Cement Co., a Division of American Cement Corp., at Detroit, says: "We checked the WONDERWALL for breakage in every step of our production—from the line to the dealers' warehouses. We were pleased to find that we were getting a reduction in breakage of about 80%, and we used about 600,000 WONDERWALLS in our operation in 1958."

Mr. Wyman (*right*) and Mr. C. M. Buchanan, packhouse foreman, are pictured in the warehouse containing WONDERWALL bags. Peerless has been using a regular kraft multiwall 3/40 and 1/50 for a total weight basis of 170 pounds, while the WONDERWALL bag is 3/50 for a total weight basis of only 150 pounds: "In our opinion, the WONDERWALL more than compensates by its strength," Mr. Wyman says.

Peerless cement—in WONDERWALL bags—comes from the conveyor to the truck loader. There's an absolute minimum of trouble here because of WONDERWALL's great strength and built-in stretch. Mr. Wyman puts it this way. "Our experience indicates that the strength of the WONDERWALL is such that with one ply *less* than standard kraft, it still is stronger."

WONDERWALLS come off the conveyor and are loaded on a Peerless truck for shipment. "In loading, as in packing and handling, breakage is reduced so much with WONDERWALL bags that Peerless is satisfied with their superiority," Mr. Wyman declares.

BAG BREAKAGE 80%!

The WONDERWALL places easily on the packing spout because of the paper flexibility. "Fifteen seconds of stoppage means a delay in filling five bags. With WONDERWALLS, we've maintained more consistent production than was possible formerly. The improvement is the result of continuing production through reduction of breakage," Mr. Wyman notes.

Containing 94 pounds of cement, each bag is dropped from the packing machine to a moving wire-mesh conveyor belt. This is another place where ordinary multiwalls are subject to breakage that means a time and money loss. WONDERWALLS demonstrate their special ability to take punishment every step of the way.

Cement travels safely in WONDERWALLS! Those bottom bags are subjected to great weight, but WONDERWALLS deliver the goods to the customer in sound shape. Mr. Wyman reports: "We checked a customer's warehouse and found WONDERWALL bags stacked nine high on two bags lying on their sides and tilted to allow easier hand-truck handling. For all the weight those bottom bags had to support, not one was broken."

Besides reducing breakage, WONDERWALLS pack faster, handle easier and stack firmly. Best of all they don't cost a penny more!

Try this superior new multiwall . . . *you have so much to gain.* Order a trial shipment of 5000 WONDERWALLS on your next carload. Write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

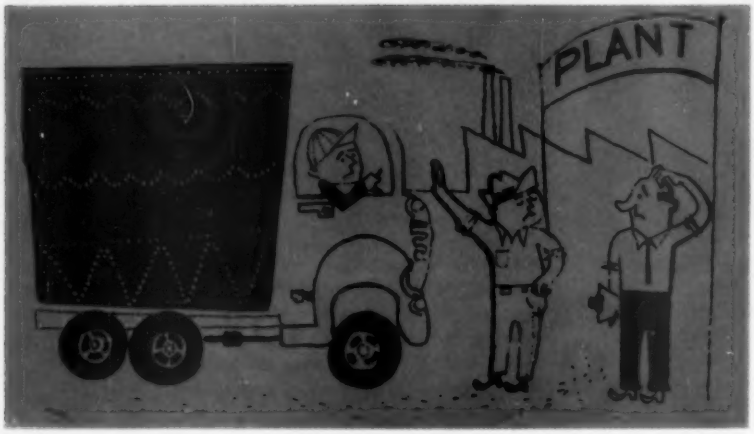
West Virginia Pulp and Paper

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

Enter 1082 on Reader Card

How would you decide?

A round-up of actual day-to-day in-plant problems and how they were handled by management men



Can you subcontract work to save labor costs?

What Happened: To save money, the company decided to eliminate its trucking and turn deliveries over to an independent contractor. Fifteen drivers lost their jobs. The union immediately took the issue to arbitration, arguing as follows:

1. These drivers were members of the union and their jobs cannot be subcontracted.
2. The company is weakening the union because it has lost 15 protected jobs.
3. If this goes on, the company can, in effect, break the union by subcontracting other jobs.

The company counter-argued:

1. We subcontract in order to save money. That's a management responsibility entirely.
2. By saving money on unprofitable operations we strengthen the company and make union jobs more secure.
3. We are not weakening the union by doing things that will make us more efficient.

Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Warns ruled: "Arbitrators generally hold that management has the right, if exercised in good faith, to subcontract work to independent contractors unless the agreement SPECIFICALLY restricts that right. This would include utilization of labor-saving devices, shutting down departments, moving the plant, changing facilities to accommodate new items of manufacture. The company's primary reason for its existence, from its point of view, is to make a profit. The question before this arbitrator is: Can a company, instead of varying its operating methods, change its procedures for merchandising its products without violating the agreement? The answer is 'yes.'

"Of course, a company cannot use 'economies' as an excuse to avoid obligations where those economies DO NOT EXIST, and are merely an excuse to hurt the union. However, this is a charge that must be proved. I find for the company."

Each incident given in this department is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to *Rock Products*.

Must men "be nice" to customers?

What Happened: Joe Grady drove a truck which delivered the company's merchandise to dealers, but he was never one for "cozying up" to customers. "I'm just a truck driver. My job is to deliver merchandise. Let the salesmen build the good will. I'm no social butterfly."

The company paid no attention to this repeated attitude until it received complaints from three dealers who charged that the driver was curt and often downright rude.

Joe was warned twice, and when another customer complained, Joe was fired. He immediately went out and got 30 letters from customers who said he was "okay." The company refused to accept these as evidence. The case went to arbitration, with the company contending that a truck driver has a "public relations" responsibility to build good will among customers.

Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Borchardt ruled: "Numerous letters obtained by Grady indicate that there were many instances where he has been well accepted. It nevertheless remains that there are a number of specific instances of discourtesy and disrespect to dealers and store managers, and insubordination towards his superiors. The letters of commendation cannot neutralize the complaints; nor do they reduce the effects of the complaints. The merits of this case must be decided on the basis of the complaints which brought about the discharge. The very life of a free economy is dependent upon good will between supplier and customer. A truck driver delivering merchandise to a customer is a representative of his firm, no less than the person classified as salesman. He creates and builds good will or ill will, depending upon his personal actions and attitudes. The discharge is sustained."

(Continued on page 35)

This scraper is one of a fleet operated by Ball and Simpson, contractors of Berkeley, California. The equipment works 16 hours a day hauling 25-ton loads of dirt and rock for a new superhighway. The company keeps this project on schedule by using B.F.Goodrich Rock Service tires. The report: even under tire-killing work conditions, Rock Service tires cut delays to a minimum—give as many as 2,000 hours' service before retreading.

B.F.Goodrich

Rock Service prevents unnecessary tire failures!

THE new B.F.Goodrich Rock Service —unlike an ordinary tire—is built to its inflated shape. This FLEX-RITE construction permits *uniform* flexing — no localized stresses that often cause unnecessary tire failures!

Look at the husky double chevron tread. The cleats bite in to give maximum traction and skid resistance in forward or reverse. Under the tread is the B.F.Goodrich FLEX-RITE NYLON cord body. It withstands double the impact of ordinary materials, resists heat blowouts and flex breaks. The B.F.Goodrich FLEX-RITE NYLON body outwears even the extra-thick Rock Service tread, can be retreaded over and over! No wonder the B.F.Goodrich Rock Service tire gives longer service in mine, quarry or dirt-moving jobs!

Western Contracting Corp. operates 2,000 vehicles to build highways, dams and air bases all over the country. Here the job is earth moving for a new runway at Wright-Patterson Air Force Base, Fairborn, Ohio. B.F.Goodrich Rock Service tires have substantially increased hours of service and substantially reduced delays due to tire failure (saving between $300 and $600 per hour, the company reports).

Opens up new opportunities

Smileage!

Call the district office nearest you for B.F.Goodrich tires and tire service

Albany, New York 4-7181	Fargo, North Dakota . . . . . AD. 2-7462	New York, New York. . . . . OR. 9-0330
Atlanta, Georgia . . . . . DR. 8-4561	Grand Rapids, Michigan . . . CH. 1-2609	Oklahoma City, Oklahoma . . JA. 5-1587
Baltimore, Maryland . . . . . BE. 5-6705	Harrisburg, Pennsylvania . . . CE. 4-5974	Omaha, Nebraska . . . . . PL. 8133
Birmingham, Alabama . . . . FA. 2-0364	Hartford, Connecticut. . . . . JA. 5-1186	Philadelphia, Pennsylvania . . JE. 5-5800
Needham Heights, Mass. . . . HI. 4-6100	Houston, Texas . . . . . CA. 7-5228	Pittsburgh, Pennsylvania . . . HI. 1-5200
Buffalo, New York . . . . . RI. 1258	Indianapolis, Indiana . . . . . ME. 7-2508	Portland, Oregon. . . . . CA. 6-3621
Charlotte, North Carolina . . . EX. 9-5621	Jacksonville, Florida . . . . . EL. 6-4167	Richmond, Virginia. . . . . EL. 5-6573
Chicago, Illinois . . . . . ES. 8-8800	Kansas City, Kansas . . . . . MA. 1-4400	St. Louis, Missouri. . . . . PR. 3-2600
Cincinnati, Ohio . . . . . BR. 1-7800	Los Angeles, California . . . . RA. 3-6692	Salt Lake City, Utah . . . . . DA. 2-2405
Cleveland, Ohio . . . . . PR. 1-0827	Memphis, Tennessee. . . . . WH. 8-6761	San Antonio, Texas. . . . . CA. 7-7543
Columbus, Ohio . . . . . AM. 8-8631	Milwaukee, Wisconsin . . . . DI. 4-5104	San Francisco, California . . . AT. 2-9620
Dallas, Texas . . . . . RI. 1-5601	Minneapolis, Minnesota. . . . LI. 5-2521	Seattle, Washington . . . . . MU. 2-4300
Denver, Colorado . . . . . TA. 5-1267	Newark, New Jersey . . . . . MA. 3-3317	Wichita, Kansas . . . . . HO. 4-6389
Detroit, Michigan . . . . . CR. 8-7000	New Orleans, Louisiana. . . . VE. 3-7231	

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

Enter the B.F.Goodrich Truck Tire Mileage Contest. You can win a Thunderbird, or Corvette, or one of 310 other prizes. See your B.F.Goodrich dealer today for entry blanks.

B.F.Goodrich *truck tires*

for tire savings

WITH THE NEWEST, BIGGEST OFF-THE-ROAD TIRE ON THE MARKET TODAY!

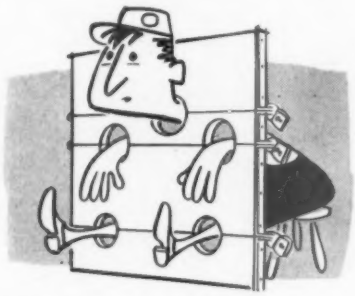
Labor Relations *continued from page 32*

Is poor work a proper cause for disciplining an employe?

What Happened: One morning Sam Hersh received a warning notice in his timecard slot. It read, in part:

"You have worked at 42 percent efficiency of the average established by other employes over a 3-month period. This is being issued as a warning that your production rate will have to be increased, or more drastic action will be taken."

Sam stormed into his supervisor's



office and complained bitterly:

1. I've worked here three years, and no other employe has ever gotten a warning like this.
2. How do you know I'm 42 percent of average? You have no written standards of performance in this department.

The foreman answered: "That's right. We have no set minimum standards for output. But we've compared your output in the last three months with others. I think 42 percent below average is pretty poor work by any standard. I'm sorry, but unless you improve, we'll have to let you go."

Sam was not satisfied. He took his case to arbitration and stated:

1. A company cannot establish efficiency standards suddenly.
2. I've been turning out the same work for over 6 months. Why did the company wait so long? They must have it "in for me."
3. I want that warning rescinded.

Answered the company:

1. We have a right to set efficiency standards any time we please. That's a management function.
2. The fact that we didn't warn you before may have been a mistake. But we sure mean business now. Better work or you're through.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Philip Neff ruled: "The company has obligations to the owners and the employes to conduct its affairs so that it can compete successfully in markets, yield profits, pay competitive wages and offer steady employment to its employes. It could not meet these obligations if it did not measure performances and require all employes to meet some minimum standards. Management authority would be meaningless unless it had the right at any time to judge efficiency and require all employes to meet a reasonable level. Sam Hersh did not meet a reasonable level and therefore deserved the warning notice."

Can you fire a worker for shooting his wife?

What Happened: As happened so often, Bob Jones and his wife were having a family argument. Finally Bob yelled, "I've had all I can stand." With that remark he ran upstairs, grabbed his 32 caliber pistol and fired two shots into the ground where his wife was standing. One of the shots grazed Mrs. Jones. She was taken to the hospital where she remained for a couple of days. Jones was arrested on suspicion of assault with intent to kill, but there were no complaining witnesses at the hearing and the charge was dropped.

The following week Jones showed up for work. He drove a truck and had been on the job for 19 years. The company decided to fire Jones because of the bad publicity and because it felt the shooting indicated that he was emotionally unstable.

Jones replied that he never had any trouble in his 19 years of driving a truck, although the work involved lots of emotional strains. Furthermore, the shooting was a domestic affair and had nothing to do with his job.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Leo C. Brown, chairman, ruled: "We cannot disregard the fact that Jones, for 19 years in an occupation which is subject to constant irritations, has given no evidence of an ungovernable temper or emotional instability. If signs of emotional instability appear, the company should be able to take the steps which seem to be required. Also, if Jones loses his acceptability to customers, the company will then have concrete evidence rather than speculation upon which to base a decision. I say that Jones should be reinstated."

If an employe is reinstated with back pay, is he entitled to overtime he missed?

What Happened: When Jack Searle was fired, his case went through normal grievance procedure until it reached arbitration. This took about 3 months. The arbitrator ruled that Searle deserved punishment, but because the supervisor failed to warn him before invoking discharge, the penalty was cut to a 4-week layoff.

Searle received 2 month's back pay at straight time. He complained: "My back pay should include the overtime I would have had during the 2-month period."

The company didn't see it that way. "If we paid Searle overtime, we would be paying twice. The man who took Searle's place was paid for overtime. Searle never worked that overtime and is not entitled to be paid." Back went the dispute to the arbitrator.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Hebert ruled: "It does not follow that an employe who has been reinstated necessarily gets the overtime worked by another man assigned to his machine. The straight time Mr. Searle has lost is clearly time lost because it cannot be recaptured. But as to overtime, all the employe is entitled to is his share under the distribution plan. He may take that share either (a) by working the overtime when offered; or (b) by declining it under circumstances in which it is counted against him. To require the company to pay it merely because he was not available for work when the overtime came up would be, in my opinion, to assess a penalty against the company.

"The effect would be to make the company pay for more overtime hours than were actually available. After all, the distribution clause means that the available overtime will be equally distributed, but there is only one 'pot' of overtime out of which all employes must be served. However, Searle has the right to an assignment of overtime work to achieve equality of distribution of overtime." **END**

CATERPILLAR'S PROJECT PAYDIRT

PROJECT PAYDIRT *pays off for you*

NEW CAT D8

PUSHLOADING: PRODUCTION UP

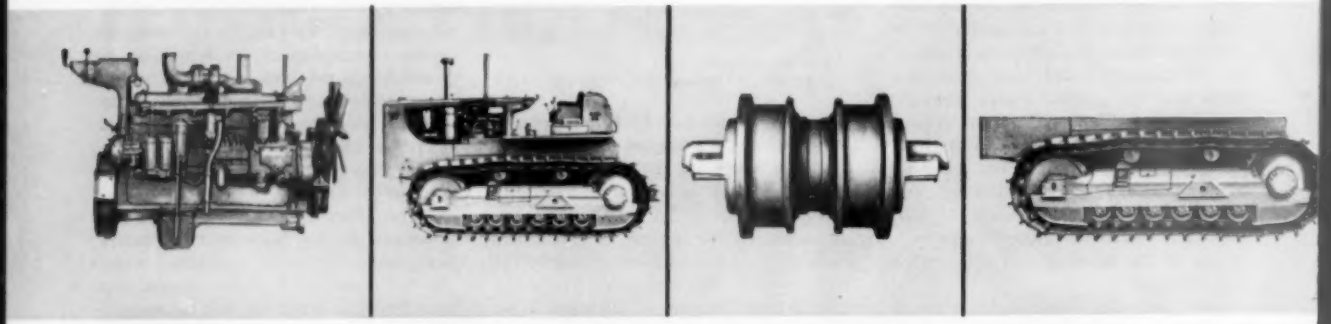
The new Caterpillar D8 Series H Tractor is ready *now* to increase its lead as undisputed king of its size class. A major achievement in Caterpillar's all-out research program, "Project Paydirt" (see box), the new D8 has been proved through a rigorous field testing program.

This D8 is new in design, appearance and performance. It is bigger, more powerful. It incorporates new engineering advances. It is easier to operate.

Now—what can it do for you? Here's the answer:

The D8 has been thoroughly field tested on actual jobs. Several of the big new tractors have been at work constantly in every kind of material. Out of the statistics developed, both pushloading and bulldozing production figures are *up*.

This means that you can move dirt faster and cheaper than ever before with a tractor in this size class. You



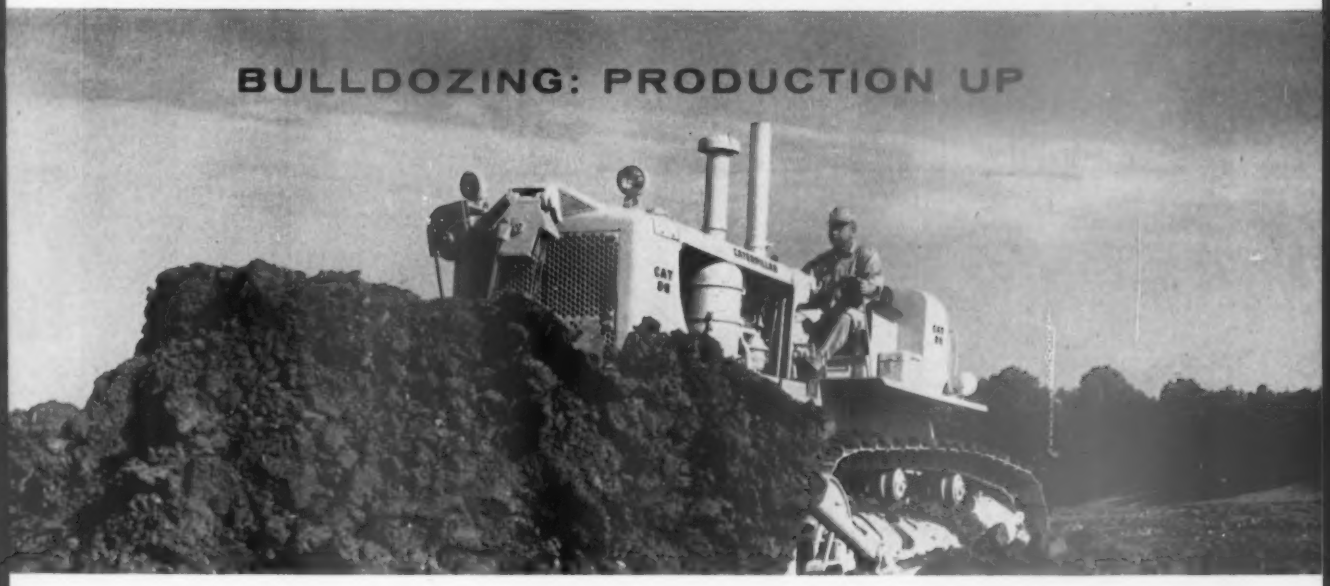
HORSEPOWER INCREASED 18%. The horsepower of the new D8 is up from 191 to 225 at the flywheel, from 155 to 180 at the drawbar. In addition, engine torque rise now is 20%, an increase of one-third. Over-all engine performance has been greatly improved by the addition of a turbocharger.

SIZE INCREASED. To make effective use of the new horsepower, over-all weight of the tractor has been increased 4,400 lb. to a total of 47,000 lb. At the same time the gauge has been increased to 84 inches, track on ground lengthened to 114 inches, square inches of contact increased to 5,505.

LIFETIME LUBRICATED ROLLERS AND IDLERS. That's right—lifetime! In a major research breakthrough, Caterpillar has achieved track and carrier rollers and idlers that never require further lubrication until rebuilding. And service life is hundreds of hours longer than with ordinary rollers.

NEW, STRONGER, HEAVIER UNDERCARRIAGE. Every component, such as frames, links, braces, pins, bushings, shoes, has been made stronger by the use of improved materials and heat treat processes to provide longer life. And ground clearance has been increased 50% to almost 20 inches.

SERIES H TRACTOR



get higher production, bigger profits—yet the new D8 is actually *more economical* to own and operate!

But find out for yourself. Get the full story from your Caterpillar Dealer, all the eye-opening facts and figures that can only be touched on briefly here. Then *see* this great new machine at work on your operation as soon as possible. You can't afford not to!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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BORN IN RESEARCH... TESTED IN THE FIELD

DRY-TYPE AIR CLEANER. Here's still another major Caterpillar research development on the new D8—the new dry-type cleaner which removes 99.8% of dirt in the intake air, even under severe operating conditions. The new cleaner can be serviced in 5 minutes, costs a good deal less to use.

SUPERIOR OPERATION. Operator visibility is excellent because of higher deck and changed seat position. Console-type controls make operator's job easier. And on torque converter models, standard foot-operated decelerator can override hand throttle—free operator's hands for other controls.

TWO MORE IMPORTANT OPERATOR CONVENIENCES

HIGHER SPEED. Completely new, long-life, direct drive transmission provides six speeds forward and six reverse. High speed has been increased to 6.3 MPH forward, 6.4 reverse to reduce cycle time. Operator can shift from any forward gear into a similar reverse gear (or vice versa) by simply moving the forward-reverse lever.

DEPENDABLE OIL CLUTCH. By contractor and operator demands, the virtually service-free, easy-to-operate oil clutch has been retained in the new D8. Another important Caterpillar exclusive.

CATERPILLAR'S **PROJECT PAYDIRT**

PROJECT PAYDIRT: Caterpillar's multi-million-dollar research program—to meet the coming challenge of the greatest construction era in history with the highest production earth-moving machines ever developed.

P&H DIESEL POWER
produces "profit-tons"

2-cycle P&H Diesels are available in 2, 3, 4 and 6 cylinder models from 40 to 280 H.P. Also available in torque converter models.

Mr. Weaver of the Weaver Construction Company likes his P&H Diesel powered 1½ yard P&H 655B Excavator. Quarrying rock at Iowa City, Iowa, he has found that this 4 cylinder P&H Engine reduces per ton costs because it has all the needed power—the quick response for fast swings—the simplicity of design to make servicing quick and easy.

When rough going is encountered, the rugged, heavy-duty P&H Diesel doesn't falter. It provides the power to "pull through" and "load out" trucks faster! Also, it burns less of low cost No. 2 fuel oil. For low maintenance consider these advantages: 25% fewer parts—interchangeability of wearing parts and a simplified fuel injection system. *One adjustment times the entire P&H Engine.*

For all of your quarrying, sand and gravel equipment power needs—specify the one diesel with all of the features that increase production and lower tonnage cost—P&H Diesel! See your P&H dealer or write for "Power for More Profit" Bulletin Z-26.

OUR 75TH YEAR
FOUNDED 1884 QUALITY P&H SERVICE BY PAWLING & HARNISCHFEGER 1959

HARNISCHFEGER

P&H **Diesel Engine Division**
Crystal Lake, Illinois

Enter 1088 on Reader Card

PEOPLE IN THE NEWS

Hatch heads association

J. EASTMAN HATCH, president of Utah Sand and Gravel Products Corp., Salt Lake City, has been elected president of the Utah Manufacturers Association. He succeeds L. Fern Pett, retired general manager of the Utah Copper Division, Kennecott Copper Corporation.

Mr. Hatch had been first vice president of the association. He will be succeeded in this post by Charles E. Ward, president of the Utah Concrete Pipe Co., Salt Lake City, Utah, who served as second vice president. Leland K. Irvine, general manager of Vermiculite-Intermountain, Inc., Salt Lake City, was elected corporate secretary of the group. Ernest F. Goodner, president, American Gilsonite Co., Salt Lake City, was named to the board of directors.

Cement sales representative

LARRY M. BINGHAM has been made sales representative in the Seattle area for the Olympic Portland Cement Co., Ltd., Seattle, Wash. A graduate of the University of Washington, Seattle, Mr. Bingham has been working in the Seattle order department of Permanente Cement Co., Oakland, Calif., parent firm of Olympic Portland.

Giant Portland president

JOHN D. WILSON has been elected president of Giant Portland Cement Co., Philadelphia, Pa. Mr. Wilson had been executive vice president since 1952. Ronald M. Craigmyle, who had been president and chairman, remains as chairman.

PCA promotes four men

WARREN G. BURRES, Hugh D. Barnes, Anthony G. Sabato and Walter E. Kunze, Jr., have been appointed to new posts with the Portland Cement Association, Chicago, Ill. Mr. Barnes, recently appointed supervisor of field promotion, has been made assistant vice president of the association. Mr. Burres is new district engineer of the Los Angeles office. He had been personnel training manager. Mr. Sabato, formerly assistant auditor, has been made auditor, and Mr. Kunze becomes personnel training chief. He formerly was assistant manager of PCA's structural and railways bureau.

Mr. Sabato, a graduate of St. Benedict's College in Atchison, Kans., joined PCA in 1947 as an accountant in the auditing department. He replaces George H. Bottum, who becomes auditing advisor for PCA.

Mr. Burres is a graduate of Purdue University, Lafayette, Ind. He joined PCA in 1952 as a railroad engineer in the structural and railway bureau.

Holder of an M.S. degree in structural engineering from Massachusetts Institute of Technology, Mr. Kunze joined the association in 1952 as a structural engineer in the structural and railways bureau.

Cement sales coordinator

JOHN E. MILLER, JR. has been named sales coordinator for Arkansas Cement Corp., Little Rock, Ark., subsidiary of Arkansas Louisiana Gas Co. A native of Searcy, Ark., Mr. Miller received his B.S. degree in commerce from Washington and Lee University, Lexington, Va.

Lime firm officer

CHALMER G. AYERS has been named assistant treasurer of Gibsonburg Lime Products Co., Gibsonburg, Ohio. He joined the firm in 1956 as controller after gaining accounting experience with several Toledo firms.

Morrison, four others promoted at American Cement

R. J. Morrison | H. L. Henson | R. L. Fosdick

ROBERT J. MORRISON is the new president of Peerless Cement Co., Detroit, Mich., a division of American Cement Corp. Mr. Morrison, formerly vice president and secretary of American and executive vice president, administration, for Peerless, succeeds Walter C. Russell, who continues as vice chairman of the board and chairman of the executive committee of American.

Mr. Morrison joined Peerless as a plant engineer in 1945. He became assistant to the president in 1953 and executive vice president, administration, in 1956.

H. L. Henson has been promoted to senior staff vice president of American from vice president, engineering, for Peerless. Roger L. Fosdick, formerly assistant to the president of American, is new secretary of American Cement Corp.

Ray Adams has been made president of American's new Phoenix Cement Co. division, which is now building a 1,650,000-barrel-a-year plant at Clarksdale, Ariz. Mr. Adams was project manager for American. Frank N. Steadman has been made vice president for sales of Phoenix Cement. He was previously assistant sales manager of Peerless.

American Cement also announced the retirement of Paul J. Rutan, vice president of American and vice president, sales, of Hercules Cement Co., Philadelphia, Pa., another American division.

(Continued on page 42)

These are the profit-proven that lead to Payhauler® fleet

Look into the rock-lugging, grade-beating 24-ton "95"...

- **Bonus-powered,** with a 335 hp high-torque turbo charged diesel engine to beat steep grades and high altitudes with full payloads!
- **Your choice of torque converter** with powershift, or 9-speed constant mesh transmission. Speeds to match every load and road.
- **Shock-cushioning** of planetary drive axles.
- **Massive frame stamina**—with 277 lbs. of high-strength, shock-resisting steel for each rated ton of carrying capacity.
- **Springs with extra leaves** and **extra length** to cushion the payload, smooth the ride.
- **Positive power-steering, Torqmatic braking,** panoramic vision, for unmatched operating ease and load-speeding safety.
- **Up to 25% higher hauling speeds**—the "95" can high-ball, fully loaded, up to 38 mph.
- **Faster reverse speeds**—for spotting to load, or positioning full loads for dumping. The gear-drive "95" can travel up to 7.1 mph. in reverse.
- **9-second dumping**—another cycle-speeding feature.

...and the 250-hp, 18-ton "65" has equally outstanding features.

International® Construction Equipment

International Harvester Co.
180 North Michigan Ave., Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Power for steep grade climb-outs wins steady job for five "65's"

Bonus Turbo Charged Diesel power to deliver extra-tonnage loads up a haul road with a 17% average grade accounts for the dependence of Caldwell Engineers on five "65" Payhaulers—on the $13 million hydro and flood-control Oliver Dam, Columbus, Ga.

Contractor doubles load delivery speed with positive Torqmatic braking!

Central Pennsylvania Quarry and Stripping Co. credits *Torqmatic braking* of their 5-unit "95" Payhauler fleet with doubling load delivery speed—by increasing safe downhill hauling speeds! They've compared "95's" directly to other off-road equipment on rock-hauling duty!

features ownership!

Prove what it means to command the Payhauler ratio of power to payload—for hauling up to 25% faster; beating grades and altitude. Try Payhauler "pick-up-truck" spotting ease—"zip-around" power steering—exclusive high reverse—and all the other Payhauler advantages. See your International Construction Equipment Distributor for a demonstration!

High-percentage availability proves inbuilt stand-up-ability!

98.5 work availability through one measured 12-week period is the mark set by a 10-unit "95" Payhauler fleet—high-balling rock over steep High Sierra grades, on mammoth Pool Hydro Project, for Southern California Edison Co. Such records result from reserve power, reserve frame and transmission strength, and reserve shock-resistance!

Another thirty "95" Payhaulers join Merritt-Chapman and Scott fleet!

Merritt-Chapman and Scott Corporation has added thirty more "95" Payhaulers to their Niagara Power project equipment spread. Now, the M-C and S Payhauler fleet totals 62 units—largest in the world! On St. Lawrence Seaway, huge Glen Canyon dam, and Niagara Power Project, M-C and S have proved rock-lugging, grade-beating Payhauler performance—and confirmed their satisfaction with repeat orders.

PEOPLE IN THE NEWS

(Continued from page 39)

Industrial relations director

CHARLES H. DWYER is new director of industrial relations of National Gypsum Co., Buffalo, N.Y. The newly created department combines the personnel and industrial relations functions. A graduate of the University of Buffalo law school, Mr. Dwyer joined National Gypsum in 1942. He had been in charge of industrial relations until his promotion.

Parker made bank director

ALVIN M. PARKER, vice president and treasurer of Smoot Sand and Gravel Corp., Washington, D.C., has been named a director of the Alexandria (Va.) National Bank. A member of the Washington Building Congress and director of the Riggs National Bank, Mr. Parker has been with Smoot Sand and Gravel for 27 years. He is a graduate of the University of Maryland, College Park, Md.

Cement firm names project engineer

ROBERT L. KERSHNER has been appointed project engineer for the Columbia Cement Division of Columbia-Southern Chemical Corp., Pittsburgh, Pa. Mr. Kershner will be responsible for studies of plant expansion and modernization. He is a graduate of Louisiana State University, Baton Rouge, La.

PCA appointments

FIELD SERVICE activities were begun by the Portland Cement Association in northern California, northern Nevada and Oregon January 1 with the opening of a San Francisco office and the appointment of personnel to service the areas.

Charles F. Moran, structural engineering specialist, and Robert E. Jones, paving engineer and general field engineer—both formerly of the association's Los Angeles district office—have been assigned to the San Francisco office. A second general field engineer will be appointed soon. They will have headquarters in Room 415 of the Russ Building, 235 Montgomery St., San Francisco.

Byron E. Jones, paving engineer and general field engineer, formerly of the Los Angeles office, will service the state of Oregon, with headquarters in Portland.

Moran, a graduate of the University of California, joined the PCA in 1953 as a general field engineer for the Los Angeles office and was appointed structural specialist in 1956.

Robert E. Jones joined PCA as a general field engineer for the Los Angeles office in 1953.

Byron E. Jones joined the association's Los Angeles office as a general field engineer in 1956.

Law and Mahon made directors of Lone Star Cement

W. F. Law R. J. Mahon

WALTER F. LAW, executive vice president, and R. J. MAHON, vice president for sales, Lone Star Cement Corp., New York, N.Y., have been elected to the corporation's board of directors.

Lone Star also announced the election of three executive vice presidents in addition to Mr. Law, who becomes executive vice president for administration. Mr. Mahon has been made executive vice president, commercial. C. C. VanZandt moves from vice president, operations and engineering, to executive vice president in charge of the same functions. John H. Mathis advances to executive vice president and secretary from vice president and corporate secretary.

H. E. Green, formerly treasurer and assistant secretary, moves to vice president and treasurer.

Mr. Law joined the firm's sales staff in 1925. He moved up through the ranks as assistant sales manager for the New York division, division sales manager in Pennsylvania, and vice president and manager of the Alabama division. In 1956 he was made a vice president of the corporation.

Mr. Mahon joined Lone Star's Albany, N.Y., sales office in 1924, and then moved to assistant division sales manager in Indiana and Pennsylvania, and sales manager in Pennsylvania before coming to the New York office in 1932. He has since served as general traffic manager, assistant general sales manager and general sales manager.

Mr. VanZandt joined Lone Star as chief engineer, New York office, in 1947. He was named vice president for engineering in 1952 and vice president for operations and engineering in 1954.

Mr. Mathis came to Lone Star as corporate secretary in 1946. He was made vice president and secretary in 1952.

Mr. Green began as clerk at the Greencastle, Ind., plant in 1925 and served in the New York accounting department before returning to Indiana as assistant division treasurer in 1947. He became treasurer of that division in 1953, assistant treasurer in the New York office in 1954, comptroller in 1955 and treasurer in 1956.

END

OBITUARIES

Edward L. Higgins, formerly sales manager of Southwestern Portland Cement Co., Los Angeles, Calif., died November 25. He was 48 years old.

Wallace Scott, co-owner since 1935 of the Overland Sand and Gravel Co., Stromsburg, Nebr., died November 4. He was 64 years old.

Frank L. Page, retired treasurer of the Portland Cement Association, Chicago, Ill., died November 10. Retired since 1947, Mr. Page was 78 years old.

Frank Tamborello, partner in the sand and gravel firm of Throstenberg & Tamborello, Houston, Tex., died October 29. He was 64 years old.

Charles B. Willard, former treasurer of the Michigan Limestone Division, U. S. Steel Corp., Detroit, Mich., died November 10 in his home in Highland Park, Ill. Mr. Willard, who also served as a member of the Chicago city controller's staff, was 71 years old.

James E. Jackson, superintendent of the Thornton, Ill., plant of Marblehead Lime Co., Chicago, Ill., passed away on November 15, 1958. He was 44 and had been associated with Marblehead since 1947.

Exclusive clam-action loaders pay big on shovel-type jobs

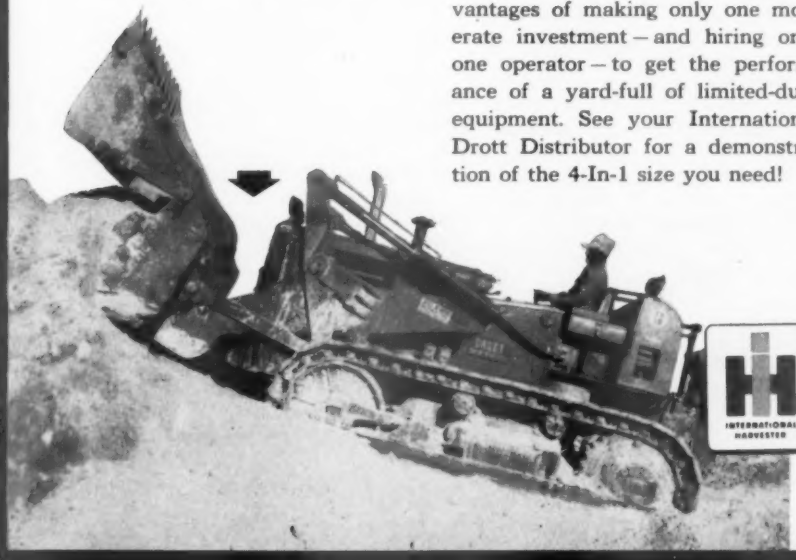
"Back-dragging" with exclusive clamshell action, the 3 cu. yd. TD-20 4-In-1 pulls down stratified layers of material by the truckload. This unit replaces big-capacity power shovel performance—loads out a 12 yd. truck *in only three fast passes.* In addition, this unit's clamshell action picks up and loads brush, stumps and boulders —provides earth-rolling bulldozer action for haul-road maintenance!

4-IN-1 acts like "40-IN-1" replacing costly, limited-duty rigs!

Simply lift the clam lip hydraulically with fingertip control—and full-capacity, big-yardage bulldozer action (with speedy Shuttle-Bar control) is instantly at your service. The TD-20 4-In-1 shown below is stockpiling 6 to 8 cu. yd. of material per pass. You'd need a bona fide, full-sized blade outfit—or a fast-swinging dragline—to match the 4-In-1's earth-moving performance as a bulldozer!

Nimble International Drott 4-In-1's are snatching profitable jobs from "under the buckets" of far costlier boom-type rigs. Find out why! Get in the driver's seat. See what it means to command built-in clamshell, "carry-type scraper," bulldozer, and famous Skid-Shovel action. Measure the advantages of making only one moderate investment – and hiring only one operator – to get the performance of a yard-full of limited-duty equipment. See your International Drott Distributor for a demonstration of the 4-In-1 size you need!

Sticky clay quits sticking in the bucket—quits gumming the works and slowing production—when you use 4-In-1 clamshell bottom-dumping. Opening the clam pulls sticky materials from bucket surfaces—gravity does the rest, to give the 4-In-1 fast, positive self-cleanout. Even clinging materials that stop conventional "single-action" buckets cold are "duck soup" for the 4-In-1's clam action!

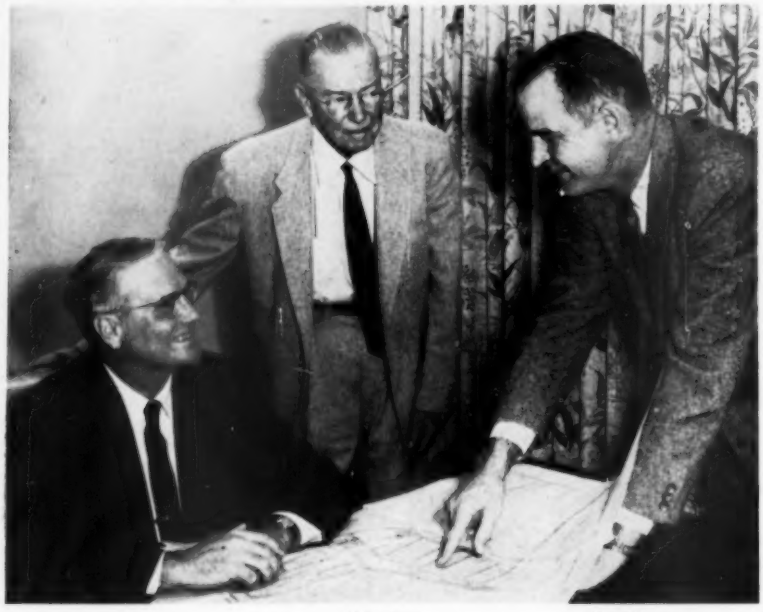


International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT

INDUSTRY NEWS

American Cement Corp. forms new division



Adams Warriner Steadman

AMERICAN CEMENT CORP. has announced formation of a new division that will produce and market cement from a $16-million plant now under construction in Clarkdale, Ariz. The division, to be known as the Phoenix Cement Co., is American's fourth and the first new division since the corporation was formed December 31, 1957, through the merger of Hercules, Peerless and Riverside cement companies, it was announced.

Phoenix Cement Co. officers are Ray R. Adams, Clarkdale, president; Frank N. Steadman, Phoenix, Ariz., vice president, and W. A. Warriner, Phoenix, assistant to the vice president. All three men have spent most of their business lives in the cement industry.

The new company's general offices are located in Phoenix. Its first big contract is with the Department of Reclamation to furnish 3 million bbl. of cement for building the Glen Canyon dam in northern Arizona. When completed, this $400-million dam will be one of the largest in the world.

Phoenix Cement's president, Ray R. Adams, 51, has served as project manager for the company's new Clarkdale plant since construction started early in 1958. He has been active in the cement industry for 31 years, coming up through the chemical departments and later transferring to operations. He attended the University of Buffalo, where he majored in chemistry. Before coming to Phoenix, he was manager of the Port Huron, Mich., plant of Peerless.

Frank N. Steadman, 52, the new company's vice president, also comes to Phoenix Cement Co. from Peerless, where he served for more than 10 years as a sales manager with offices in Detroit, Mich. Mr. Steadman is a graduate of Denison University, Granville, Ohio.

W. A. Warriner, assistant to the vice president, served for 35 years as sales manager of Riverside Cement Co. in Arizona. He is a graduate of the University of Chicago.

New firm

THE EMPIRE SAND & GRAVEL CO., Denver, Colo., has been organized by Mark C. Crandall and Carl Baessler, Junior.

Rich silica deposit found in Kentucky

A DEPOSIT of exceptionally pure silica has been discovered on a mountainside in east Kentucky, 2,800 ft. above sea level. The deposit is 2½ miles long, 200-400 ft. high and contains an estimated 600 million tons of high-quality silica sand. University of Kentucky geologists found the stone to be 98.8 percent pure silica.

The deposit is located south of Elkhorn City, Ky., on a ridge forming the border between Pike County, Ky., and Buchanan County, Va. Access to it is limited to an unimproved dirt road.

Kentucky Silica Products Corp. has been organized to develop and market the silica. Incorporators of the leaseholding firm were Joe Weddington, Prestonburg, Ky.; James E. Vance, Pikeville, Ky.; George Norvel, Point Pleasant, W. Va. They plan to blast the silica off the mountainside and run it by belt conveyor to stockpiles at the preparation-plant level. The company is in the process of completing its corporation structure and has no definite plans for starting production.

New Haven Trap Rock expands plant

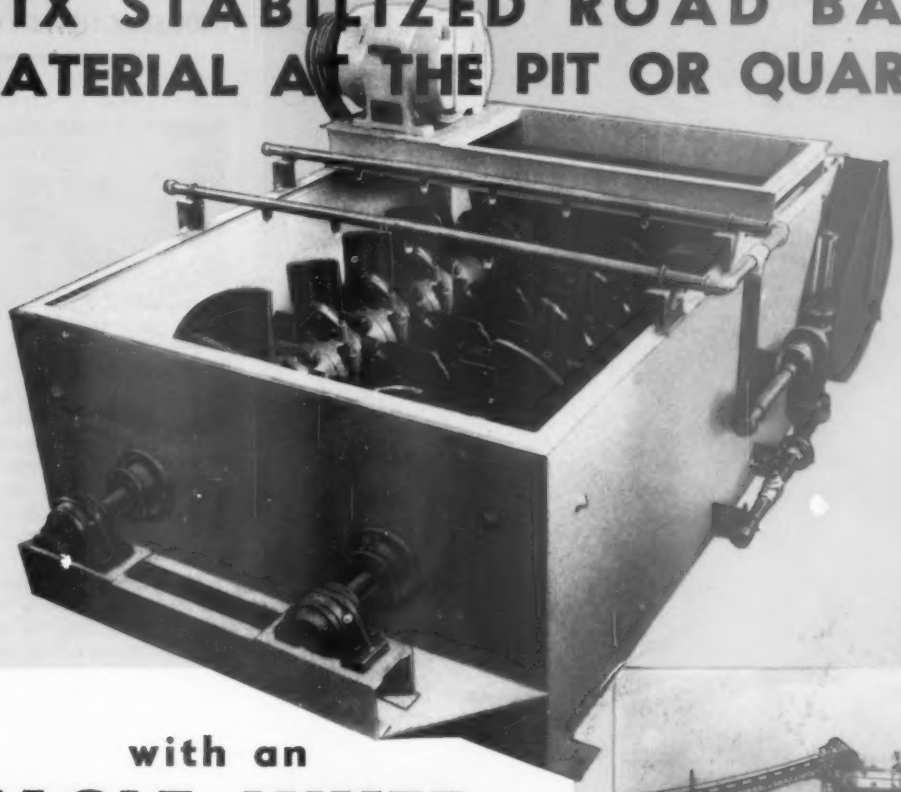
THE NEW HAVEN TRAP ROCK CO. has begun construction of a new screen house at its plant in North Branford, Conn. The expansion project includes additional crushing equipment and an increase in screening and storage areas so the company can double production of smaller size crushed trap rock.

The new structure and its equipment are being erected adjacent to the existing mill and crushing buildings. It will rise 100 ft. high, the equivalent of a 10-story building, and will be 138 ft. long and 40 ft. wide. It will have a live storage capacity of 3,000 tons, and in a normal 8-hr. day each of its six 500-ton bins will be filled an average of two times.

Rails mounted flush with the pavement on two parallel loading lanes will permit trucks and railroad cars to use the lanes interchangeably and simultaneously.

(News continued on page 46)

MIX STABILIZED ROAD BASE MATERIAL AT THE PIT OR QUARRY



with an EAGLE MIXER

A BETTER QUALITY of stabilized road base material can be produced at the quarry or pit with an EAGLE MIXER. A far more thorough mixing action is provided than by mixing materials in-place on the right of way. Optimum moisture means quick compaction—more and more highway contractors are seeking plant-mixed stabilized road base material. This is an extra source of revenue to aggregate producers.

The EAGLE MIXER consists of a tub with rows of opposing paddles on two tubular steel shafts. The paddles not only thoroughly mix and blend the materials, but convey them toward a discharge opening at the same time. Mixer can be erected over a bin or hopper with clamshell gates or mounted at an elevation for discharging directly into trucks. Mixer can be equipped with spray bars and water metering system, as optional equipment.

The EAGLE MIXER blends fine and/or coarse aggregate with required additives and water. Better dispersion of all elements throughout the mixture is assurred—mixes any road base materials for supporting asphaltic or concrete pavement. These rugged units are available in four sizes; capacities of 125 to 500 t.p.h. Get the facts—send for Bulletin 1258 today!

Eagle Stabilized Road Base Mixer at Louisville Crushed Stone Co., Louisville, Ky.

Eagle Mixer blending coarse sand, clay and water for road base at a Kansas aggregate plant.

SINCE 1872

EIW

EAGLE IRON WORKS

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

137 HOLCOMB AVENUE, DES MOINES, IOWA

Manufacturers of: Aggregate Washing and Classifying Equipment, HMS Plants, Dredging Equipment, Pile Hammers and Breaker Balls.

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INDUSTRY NEWS

(Continued from page 44)

New Solite plant built in Florida

A NEW SOLITE production plant will be opened April 1 in Russell, Fla., just south of Jacksonville. It will be the first plant to open under the newly incorporated Florida Solite Corp., a wholly owned subsidiary of Southern Lightweight Aggregate Corp., Richmond, Va.

The plant, now under construction, will produce Solite, a lightweight aggregate. Operating on a 24-hr.-a-day, 7-day-a-week schedule, the Russell plant will depend upon the Atlantic Coast Line Railroad to deliver carloads of Solite throughout the state and surrounding areas.

Solite lightweight structural concrete and masonry units have been used in the Chesapeake Bay Bridge, whose 3½-mile roadway and deck are constructed of Solite concrete; the 3¼-acre roof of the Capitol Building, Washington; the new Reynolds Metals Building in Richmond, Va. (above), and the Westinghouse Meter Plant in Raleigh, N. C.

Portland Cement Assn. elects four new members

THE PORTLAND CEMENT ASSOCIATION has announced the election of four new members and the extension of its field service activities into northern California and Oregon. The four new members of the association are Halliburton Portland Cement Co., Corpus Christi, Texas; Saskatchewan Cement Co., Ltd., Regina, Saskatchewan, Canada; Northern California Division of Ideal Cement Co., San Francisco, Calif., and Oregon Division of Ideal Cement Co., Portland, Ore.

Reestablishment of association field service in northern California will be through a sub-office of its Los Angeles district office, which was established in San Francisco in January. Service to cement users in Oregon will be furnished through the association's Seattle district office, also effective January 1, 1959.

(News continued on page 47)

INDUSTRY NEWS

(Continued from page 46)

Court upholds refund to Ohio stone firm

THE U. S. SIXTH DISTRICT Court of Appeals said November 18 that the Wagner Quarries Co. of Sandusky, Ohio, is entitled to a $123,919 judgment from the federal government. The decision affects seven other stone companies in the Toledo area.

The judgment upholds a ruling by Federal District Judge Frank L. Kloeb who ruled in October, 1957, that the Sandusky company was entitled to the refund. The government appealed the case. The dispute concerned a refund of taxes for the year 1951. The government said the company was entitled to a 10 percent refund instead of the 15 percent refund which the company had claimed.

During World War II the government allotted depreciation allowances of 15 percent to stone companies to encourage production for war purposes. The allowance was 10 percent if the stone did not meet certain requirements. In the Wagner case, the government said the company was entitled to only a 10 percent allowance because of the end use of the product.

The District Court, in upholding Judge Kloeb, said the end use of the products had nothing to do with the depreciation allowance. It said such allowances should be based only on the grade of stone.

Involved in similar action for the years 1951 through 1953 are the Maumee Stone Co., Maumee, Ohio; Auglaize Stone Co., Oakwood, Ohio, and the Ohio and Indiana Stone Co., France Stone Co., France Co., Erie Stone Co. and the Toledo Stone & Glass Co., all of Toledo.

Operations begin at U. S. Gypsum plant

OPERATIONS WERE SCHEDULED to begin in early January at United States Gypsum Co.'s new $12-million plant in Galena Park, Texas. Work at the gypsum plant was to start with one shift, about 20-30 percent of the plant's potential capacity. The plant will produce wallboard and other products. The formal opening of the plant is scheduled for February 19.

U. S. Gypsum will import rock from Jamaica aboard its fleet of six ocean-going cargo vessels. Ground was broken for the new plant in March, 1958.

(News continued on page 50)

M-F Work Bull 1001 has instant reversing (without shifting), direct line thrust, 43° rollback, plus eight change-in-the-field attachments.

M-F – the FIRST to take the Right Approach to LIGHT INDUSTRIAL EQUIPMENT

Only M-F Work Bulls with Davis-engineered loaders, backhoes, and other attachments fill the bill for light industrial equipment with proven quality and customer acceptance.

They are specially designed for industrial use with many features found only in bigger, more expensive equipment.

The same machine and the same operator can do scores of jobs – trenching, backfilling, loading, clearing, lifting, material handling, or cleaning up – to keep your job rolling and your profits multiplying.

Because M-F rigs depend upon speed, maneuverability, and proper application of power instead of brute force and single-load capacity, they work circles around – and replace – costly, single-purpose machines in many cases.

Your Massey-Ferguson Industrial Dealer can help you select just the right power package for your operation – and he'll back it up with service. Write today for free literature and his name and address.

Work Bull 1001 | Work Bull 303 with 500 Loader and Davis Backhoe | Work Bull 202 with Davis Loader and Backhoe | Work Bull Fork Lift

MASSEY-FERGUSON INDUSTRIAL DIVISION

1009 SOUTH WEST STREET • WICHITA 13N, KANSAS

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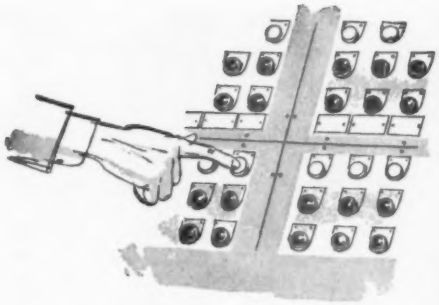

Fingertip control with

JEFFREY VIBRATING FEEDERS

...one man runs stone reclaiming operations, screening and washing plant, secondary crushers

Get details on how Jeffrey vibrating equipment and controls can simplify your materials handling job and save you money.

Write for Catalog 930. The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

THIS quarry produces both high calcium limestone and dolomite products. From a strictly operating standpoint, *one man at a Jeffrey-designed control panel* runs the screening and washing plant, two secondary crushers and reclaiming operations monitored by 15 Jeffrey vibrating feeders.

Jeffrey feeders under primary surge piles feed stone to the plant via reclaiming tunnel belt conveyor. Vibrating grizzlies with bars on 3" centers allow fine material to fall to belt conveyors ahead of coarser stone, insuring longer life for the belt.

Jeffrey vibrating feeders were also selected for reclaiming finished stone from stockpiles. At these feeders, flow of stone actuates a swing baffle which signals control panel operator that material is flowing properly. Even blends of stone can be obtained by regulating flow from stockpiles to reclaiming belt ... through remote-controlled Jeffrey vibrating feeders.

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

JEFFREY

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INDUSTRY NEWS

(Continued from page 47)

Cement plant expansion okayed

PORTLAND CEMENT CO., Salt Lake City, Utah, has been given a green light to go ahead with a $1.5-million expansion program. The approval was given by the board of adjustment of the Salt Lake City planning commission. Permission was granted on condition that new dust collection equipment actually be built into the firm's operation.

Residents of the area were present at the board meeting to register complaints about smoke and dust annoyances in the past. Company officials said the addition would double the plant capacity but completely eliminate dust. Reassured of the company's intentions to eliminate a troublesome problem, area residents gave approval to the expansion.

Ashby Snow, president and manager of the company, said three mechanical separation units, one at each of the present two kilns and one at a proposed new kiln, would remove 75 to 80 percent of the dust in the operation. The remaining dust would be completely eliminated in silicon-treated glass bags in a new baghouse, he added.

New potash plant in production

FIRST POTASH mined in Canada has been brought to the surface near Saskatoon, Saskatchewan. The Potash Company of America's $20-million plant at Patience Lake, some 17 miles east of Saskatoon, is now in operation. The first trial run brought up 10 tons of rock salt and potash ore from 3,333 ft. underground. The plant is expected eventually to serve markets all over the world.

The only other potash mine in North America is at Carlsbad, New Mexico. There will be another one in production in Saskatchewan — near Esterhazy—in a couple of years. Here are the main features at the Saskatoon district plant: Potential annual production—600,000 tons of potash ore; potential annual value of this production—$12 million; eventual number of workers—200; estimated payroll—$1 million a year.

Saskatchewan is said to have the largest commercial reserve of potash in the world. Exploration so far has uncovered a belt of potash some 300 miles long.

(News continued on page 52)

Wet clay and shale build up 20" thick on hopper walls, but Wobbler Feeder bars remain free and clean as they scalp off sticky fines.

Wet clay was no problem for this all weather UNIVERSAL plant

"Our Wobbler Feeder-Impact Master combination helped us shorten a 60-day road stone contract by three weeks"

says Lloyd E. Quarve, Quarve & Anderson, Rochester, Minnesota

"In the summer of '57 we had a road contract on Minnesota Route 30 for 100,000 tons of 1½" — and 30,000 tons of ¾" aggregate to be produced in 60 days.

"The quarry was full of broken limestone mixed with clay and shale—tough to work under normal conditions — nearly impossible after one of our frequent torrential rains.

"In previous years under soggy conditions, our output would drop one-third — with plenty of overtime needed to dig out the equipment and catch up on lost tonnage.

"But all this trouble is behind us now with our Universal plant. This is a 4650 Impact Master with a 9" pitch Wobbler Feeder ahead of it; a portable combination with good production, rain or shine.

"During the Route 30 job, we got some heavy downpours that would have meant the same old problem. Ten per cent of the feed was clay, shale and broken stone under two inches. With the Wobbler taking this out ahead of the Impact Master, we stayed right on the job producing at full capacity day after day . . . and finished the Route 30 job *three weeks* ahead of our 60-day deadline."

Universal Impact Masters are "all-weather," performers. They are designed to insure unimpeded crushing action. Construction of the rock-breaking chamber prevents buildup of wet, sticky materials. The straight-line flow of material from entry to discharge keeps rock moving without interruption.

Fines go through Wobbler bars to an under conveyor. Wobbler separation of sticky material guarantees increased efficiency and capacity of *any* crusher.

Combine the self-cleaning Universal Wobbler with an Impact Master and you, too, will have an unequalled crushing equipment team!

Patented Wobbler Feeders together with different kinds of crushers are at work everywhere. To help you with your problem; tell us the size of fines to be separated, the percentage of fines this size in the feed, and the desired tons to be handled per hour. We will recommend the right size Wobbler and other equipment best suited to your needs — at no obligation.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

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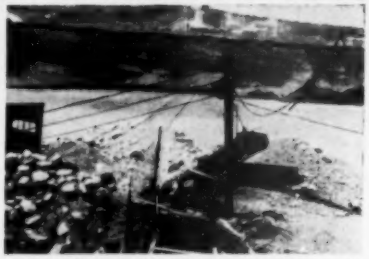
SAUERMAN NEWS briefs

SAUERMAN BROS., INC.,
630 South 28th Avenue, Bellwood, Illinois
Linden 4-4892

4-YARD DRAGSCRAPER ELIMINATES A SHIFT AND UPS PRODUCTION

At the Union Sand and Gravel Co., a Sauerman DragScraper Machine gives Union the production necessary to supply increased plant demand in just one shift. Two shifts were required with their previous installation when a smaller Crescent and hoist were used.

The 4-yd. DragScraper delivers 175-cu. yds. or about 250 tph. when digging 400 ft. from the hopper. Power is supplied by a Sauerman three-drum hoist which has an inhaul speed of 500 fpm. with loaded bucket and a 1,000 fpm. backhaul speed. A 30-ft. tubular steel mast equipped with Durolite blocks forms the head end assembly. Operating cables from the hoist are reeved through the head end Durolites to the rapid-shifting tail bridle system 500 feet away.



A trolley and tail block travel the tail bridle cable. Lateral shifting of the trolley by the third drum changes the Crescent DragScraper's line of operation.

(Condensed from Sauerman News No. 144.)

Slackline Delivers From Pit To Pile On 850-Ft. Span For About 6¢ per Ton

For over thirty years, Louis Marsack and Sons have used Slackline Cableways to dig and haul sand and gravel to their plant. They are presently using two 1½-yd. Slacklines which work at right angles and deliver material to adjacent stockpiles. Both are working on 850-ft. spans. One is digging 60 ft. below water and the other in 90 ft.

Operating costs are estimated to be about 6¢ per ton. This includes fuel, labor and maintenance.

The stockpiles are rehandled by a crane to a grizzly hopper feeding a conveyor to the plant. The setup is ideal as it permits blending the material obtained from the two different deposits.

The Marsack's newest Slackline is a torque converter diesel powered unit. This machine is also equipped with the new Slackliner Bucket which is designed for tough-to-dig deposits. Both Slackline Cableways are air controlled.

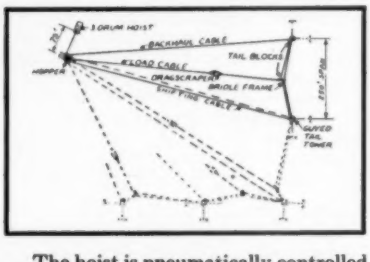
(Condensed from Sauerman News No. 153.)

Enter 1061 on Reader Card

DragScraper Supplies Gravel for 82 Miles of Turnpike

More aggregate production was needed by Southern Michigan Materials, Inc. to supply structural and, upon completion, the maintenance and incidental needs for 82 consecutive miles of the Ohio and Indiana Turnpikes.

This demand was met with a new plant and a 5-yd. DragScraper which supplies gravel at the rate of about 275 tph. Digging goes to a depth of 75 to 80 ft. Power is provided by a Sauerman three drum hoist driven by a 325-hp. diesel. The rapid-shifting bridle provides a means of changing the DragScraper's line of operation by placing the tail block attached to the bridle in another position along the 250-ft. span between the two steel tail towers.



The hoist is pneumatically controlled by the operator from the hoist house. His location gives him excellent visibility of the entire pit and most of the plant.

(Condensed from Sauerman News No. 145.)

MORE NEWS AND INFORMATION

Issues of Sauerman News giving greater detail about the installations on this page are available on request. For full information, tell us your interest or requirements and ask for catalog. Contact Sauerman Bros., Inc., 630 S. 28th Ave., Bellwood, Ill.

INDUSTRY NEWS

(Continued from page 50)

Lightweight aggregate from molten boiler slag

MOLTEN SLAG from wet-bottom, slag tap boilers can be converted from a waste material to a marketable product—lightweight aggregate—with a process developed by The Dow Chemical Co. Lightweight aggregate produced by the process is suitable for use in concrete masonry units, precast concrete wall and roof sections and in lightweight concrete.

Dow already has the process in operation at the South Power House at its Midland, Mich., plant, shown here, and has marketed the aggregate locally on a limited scale for use in the manufacture of lightweight concrete block.

The company plans to license the process to utilities or other firms with suitable slag tap boiler installations. Adaptability of the process in an existing installation depends primarily on space available.

The aggregate produced by the process at Midland has been trademarked Dowlite. It is an iron aluminum silicate aggregate that exhibits both light weight and strength characteristics as well as good free-flow qualities in block machines. It has the appearance of black glass when cold and is designated as amorphous. The aggregate is inert and contains no unburned combustible material.

The slag is melted boiler ash resulting from the combustion of coal. This is processed to produce expanded slag. Crushing and screening give a mineral aggregate in two sizes—coarse, which will pass a No. 2 mesh and be retained on a No. 4 mesh, and fine, which will pass a No. 4 mesh.

Authorization granted

THE CHRISTENSEN SAND & GRAVEL Co. of Alameda, Idaho, has been granted authorization by the Idaho Public Utilities Commission to haul sand, gravel and aggregates within 100 miles of Pocatello, Idaho.

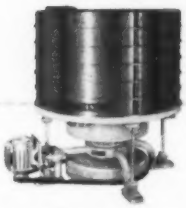
(News continued on page 55)

Standard inclined screens . . . up to 5 inches. (Shown with air springs.)

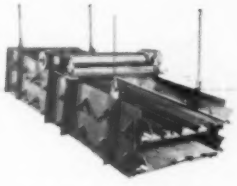
SCREENS

world's most complete line!

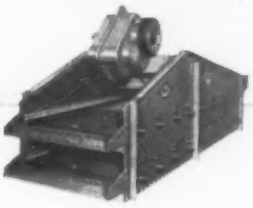
separations from 12 inches to 325 mesh



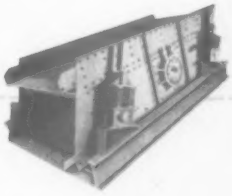
All-metal gyratory screens . . . 2 to 325 mesh.



Small inclined vibrating screens . . . 1½ inches to 40 mesh.



Horizontal vibrating screens . . . up to 2½ inches.



Heavy duty scalping screens . . . . up to 12 inches.

Expert application help. Allis-Chalmers not only offers the most complete line of dependable, high-production screens, but also provides expert counsel based on unequaled experience in screen applications. In addition, modern pilot plant facilities are available for test runs of difficult or untried materials, if necessary.

For your copy of valuable screen selection guide, 25C6177M, write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

- Suspended or floor mounted, or supported on air springs.
- Wet or dry operation.
- Screens for hot materials handling.
- Inclined or horizontal.
- Dustproof enclosures.
- Electrical and mechanical anti-blinding devices.
- Screens designed for special applications.
- And you get your screen complete with motor, drive and control — all built by Allis-Chalmers.

ALLIS-CHALMERS

A-5819

Enter 1009 on Reader Card

See the NEW McNally Pittsburg

"SHORTY" Belt Conveyor

—that increases belt life, slashes maintenance cost!

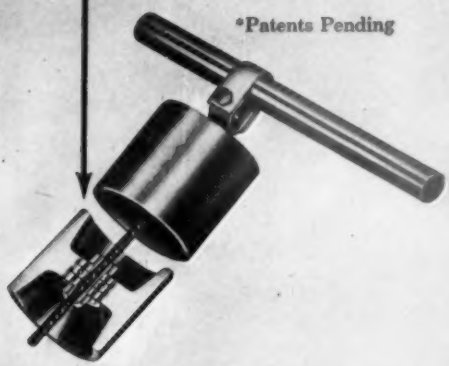
The "Shorty" unit is only 2 feet high!

The new "Shorty" underground conveyor featuring the new McNally Pittsburg Cradle Idler is ideally suited for use in limited working areas. Vertical supports are only 2 feet high. For extremely low clearance installations these conveyors can be made with 3″ diameter rollers (instead of the standard 5″), and the average over-all height can be as little as 17″ for a 36″ belt, using a 30° deep trough idler construction.

For "Do-it-yourself" construction, the H-frames and stringers (which may be either wire rope or pipe stringers) are shipped disassembled and may be assembled in the field to fit any conveyor length necessary. It is only necessary to cut the stringers to the desired length, attach the Cradle Idlers and H-frames, and your conveyors are ready for operation.

Exclusive NEW Patented Cradle Idler*

*Patents Pending



The secret of the dramatically improved performance and lower maintenance cost of this new heavy duty conveyor is the *true catenary suspension* of the Cradle Idlers. Since the rollers *rotate* on the steel rope, dangerous "loping and harmonics" cannot develop. The 5″ rubber rollers, assembled on precision ground ball bearings, are prelubricated, lifetime sealed.

- Increased belt life—because full belt support is maintained under all conditions
- No creasing or cutting of belt
- Minimum maintenance

McNally Pittsburg Mfg. Corp., Pittsburg, Kansas

☐ Please send information on the new McNally Pittsburg belt conveyor.

☐ Have Sales Engineer call for further consultation.

Name_____ Title_____

Company_____

City_____ State_____

RP

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Pittsburgh • Chicago
Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

INDUSTRY NEWS

(Continued from page 52)

Boron research to be launched

DOW CHEMICAL CO., Midland, Mich., and United States Borax & Chemical Corp. will launch a joint research project to find an economical process for making boron tricholoride.

Boron tricholoride is an intermediate chemical from which several new boron compounds are made, including boron high-energy fuels for the space age, gasoline additives, catalysts and high-temperature materials.

U. S. Borax, headquartered in Los Angeles, is a large producer of borate products and Dow produces chlorine, both of which are basic materials for boron tricholoride. The joint research for a cheaper means of making the chemical will be carried out at Dow's Texas division in Freeport, Texas, according to a U. S. Borax announcement. If the venture is successful, it could be the basis for both companies' entering the manufacturing of boron tricholoride, the announcement said.

Medusa directors approve stock split

A TWO-FOR-ONE STOCK SPLIT for shareholders of record January 5, 1959, was approved October 28 at a regular meeting of the board of directors of Medusa Portland Cement Co., subject to approval by the shareholders. At the same time directors declared the regular 40-cent dividend and a year-end extra of 40 cents per share, payable December 19. Dividend payments for the year 1958 would total $2.00 on the basis of then outstanding stock. In 1957 the company paid $1.80 per share.

Ellery Sedgwick, Jr., president, said the directors hoped that the split would result in wider ownership of the company's stock. The action, he said, would not change the equity or interest in the company of the individual shareowner, but should benefit him by increasing the marketability of his shares. A special meeting of shareowners of record November 7 was to be held December 15 to vote approval of an increase in authorized capital stock from 1.5 million to 4 million shares. An increase is necessary in order to permit the two-for-one split.

Medusa's third quarter Interim Report showed a 13-percent increase in shipments and a 22-percent increase in net profit over the like period in 1957.

(News continued on following page)

INDUSTRY NEWS

(Continued from preceding page)

Material Service suspends merger negotiations

MATERIAL SERVICE CORP. and General Dynamics Corp. suspended merger negotiations in December because "technical difficulties" made the proposed merger unfeasible at that time, Henry Crown, chairman of Material Service, announced. Mr. Crown said that negotiations could be resumed at any time.

Merger discussion between the two firms had been underway for several months. At one time there was speculation that the merger would be effected by an exchange of stock between the companies.

Material Service operates a giant building materials network in the Midwest. It quarries limestone and produces gravel, lime and concrete. General Dynamics primarily designs and builds aircraft missiles and submarines. It also produces communications and other equipment and manufactures and distributes liquid and compressed gas products.

Portland cement production

PRODUCTION OF FINISHED portland cement in October, 1958, as reported to the Bureau of Mines, totaled 32,847,000 bbl., an increase of 9 percent over October, 1957. Mill shipments in October, 1958, totaled 36,615,000 bbl., an increase of 19 percent over the year-earlier figure. Stocks of 20,412,000 bbl. of finished portland cement on hand October 31, 1958, were 6 percent more than those on hand at the end of October, 1957. Clinker production during October, 1958, totaled 29,905,000 bbl., an increase of 4 percent over the October, 1957, production. These figures were provided by 164 plants in 37 states and Puerto Rico.

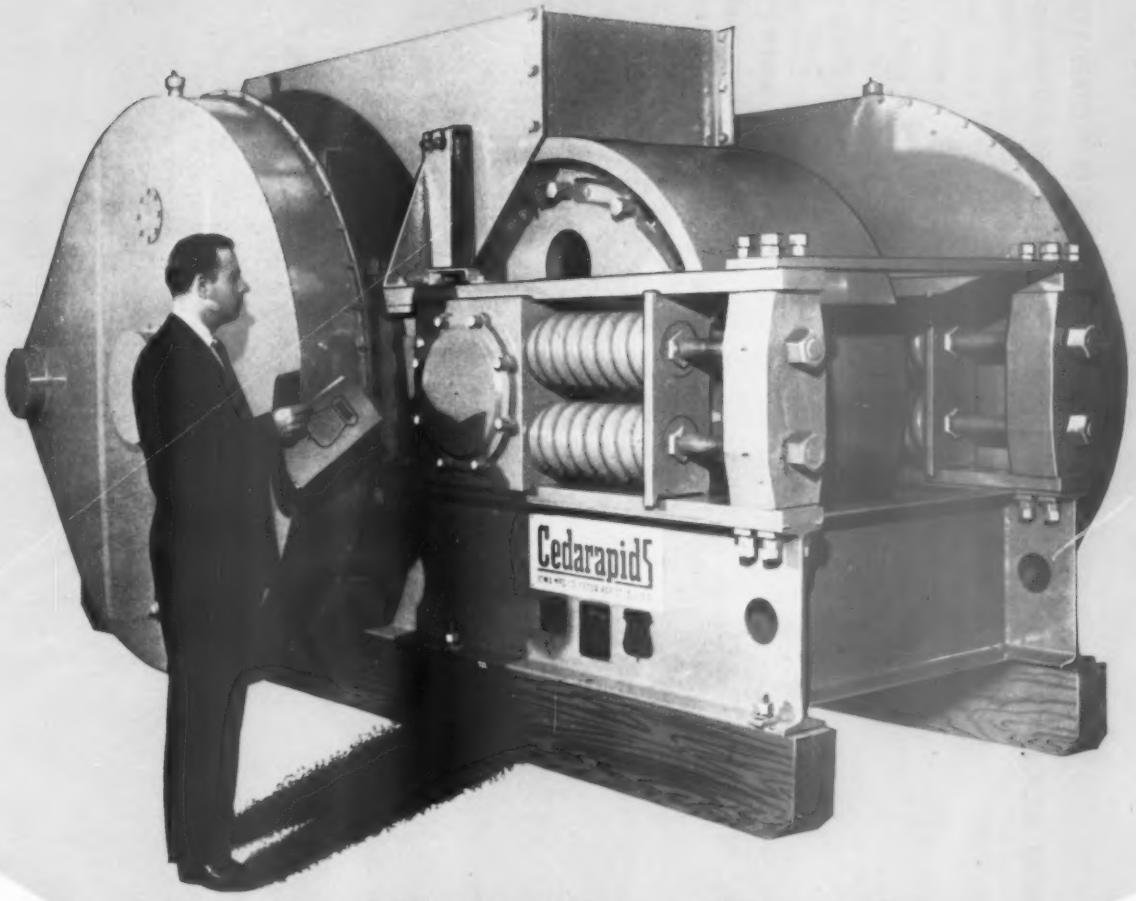
Giant portable plant for Giants' stadium

CONTRIBUTING ITS SHARE to the construction of the San Francisco Giants' new stadium is what is believed to be the largest portable crushing plant in existence. The Universal 293QS is grinding out 200,000 tons of aggregate for parking-area base material and asphalt surfacing. Seventy-seven acres will provide parking for nearly 8,000 cars and enough buses to carry 12,000 passengers. The stadium is to be occupied in the 1959 season.

(News continued on page 60)

You're tons ahead with this BIG

CEDARAPIDS 5530 ROLL CRUSHER



These big-performance features tell you why

Big Secondary Production of material from ¼" to 5" pours steadily through this big roll crusher with its 30" wide rolls, to keep aggregate plants operating at a highly profitable pace. The big 55" diameter rolls nip into larger size feed material—as a result, the primary crusher can be opened to increase over-all plant capacity.

Low Maintenance assures big profit. Every feature of the 5530 Roll Crusher is engineered to give steady high production day-in and day-out for month after month. To take the stress of crushing, bearings are designed for extremely heavy-duty service. Extra-heavy countershaft assures steady, high capacity even under surge loads. Rugged frame is engineered with high-strength steel I-beams and welded crossbeams to hold countershaft bearings, gear and pinion, and stationary roll bearings in rigid alignment. You get high-tonnage output day after day from the Roll Crusher that's built to take punishment!

Extra Power, with large, heavier-than-average flywheels turning at high speed on an extra-heavy-duty counter shaft, easily handles surge loads due to uneven feeding . . . and gives this Cedarapids Roll Crusher the most economical power consumption rate per ton of material crushed.

More Efficient Feeding also steps up production. Material is dropped *between* the rolls. Its speed of falling permits maximum penetration into the crushing area, allowing faster feeding and resultant greater hourly output. A special feed box with an angle divider spreads material across the full width of the rolls to utilize the entire crushing area and prevent uneven wear on the roll shells.

Other job-proved features include: Patented shear plates that protect the crusher from uncrushable material without resorting to numerous heavy springs; extra-rugged spider cores for roll shells; easy shim adjustment for rolls; a wide range of roll shell surfaces including smooth, corrugated, or beaded.

Cedarapids
Built by IOWA

IOWA MANUFACTURING COMPANY Cedar Rapids, Iowa, U.S.A.

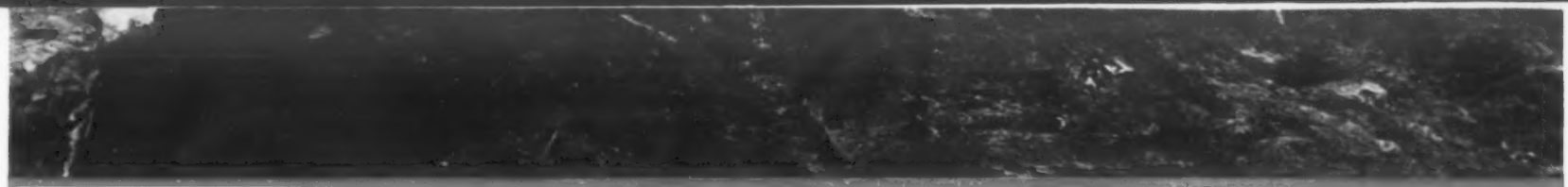
THE ALLIS-CHALMERS TR-260 ROCK WAGON

Extra power and capacity for bigger hauling output

230 HORSEPOWER • 20-TON PAYLOAD

Here's news worth swinging around to see...

The new TR-260 delivers up to 15 percent more horsepower than other rock wagons in its size range . . . extra power for better acceleration from the pit . . . faster hauling cycles. The TR-260 also gives you more load-carrying capacity than ever before . . . two extra tons. You'll like the new TR-260 design . . . and the low TR-260 price. Get facts and figures . . . and a hauling demonstration at your pit or quarry. You'll be convinced—and dollars ahead if you buy.



230 horsepower—more than 11.5 available horsepower for every payload ton.

90-degree turns—you save an average of 15 seconds per cycle when spotting under shovels or backing up to hoppers.

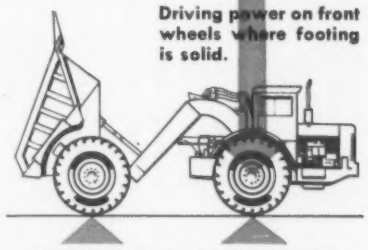
U turns in only 24 ft, 4 in.—you require 20 to 50 percent less turning space than wagons of comparable size.

High ground clearance—with 25¾-in. wagon clearance, the R-260 rolls over high spots. No hang-up problems.

Five speeds to 28 mph—you shift quicker, easier with constant mesh transmission and new actuated transmission brake . . . no double clutching.

Bigger tires—26.5 x 25 low-pressure tires swallow humps and holes with less chance of damage to themselves . . . far less shock to the entire unit. Better traction and flotation, too.

68-degree dumping angle—material rolls out of the clean, unobstructed bowl in a hurry.



Fixed wheel base—solid as a rock . . . and safe . . . The TR-260 dumps with all four wheels braked . . . no need to back up tractor to get loads out. And on the getaway, power is on the forward wheels where footing is solid. No bog-down on embankment lip.

Interchangeability for added earnings . . . The T-260 tractor hauls either the R-260 wagon or S-260 scraper interchangeably. Use the TR-260 for off-the-road hauling—then switch to the TS-260 for stripping or contract earth moving. Earnings are increased . . . you get 100 percent tractor efficiency and reduce equipment investment at the same time. *Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.*

move ahead with ALLIS-CHALMERS . . . power for a growing world

INDUSTRY NEWS

(Continued from page 56)

National Gypsum plans acquisition

CHAIRMAN MELVIN H. BAKER of National Gypsum Co. and Norris E. Phillips of The Olean Tile Co., Inc., announced December 8 that their companies were considering an exchange of stock under which National Gypsum would acquire Olean Tile Co. Olean Tile is one of the country's largest manufacturers of unglazed ceramic mosaic tile, which is primarily used as floor tile.

Mr. Baker said that when the final contract had been prepared, National Gypsum would make application to the New York Stock Exchange to list the new shares of National Gypsum common stock which the company would issue to acquire Olean Tile. All the outstanding shares of Olean Tile would be exchanged for shares of National Gypsum.

Drilling and blasting symposium at U. of M.

THE EIGHTH ANNUAL Drilling and Blasting Symposium presented by the School of Mines and Metallurgy and the Center for Continuation Study of the University of Minnesota was held on the university campus in Minneapolis October 2-4. The symposium was sponsored jointly by the University of Minnesota, Colorado School of Mines and Pennsylvania State University. It followed the previous plan of combining the knowledge and talents of research and development personnel with those in operations to solve the problems of drilling and blasting.

New Ideal plant goes into operation

IDEAL CEMENT CO. began producing cement in October at its new Ada, Okla., plant, being built at a cost of over $20 million. When completed next May alongside the firm's existing plant, the new one will double Ideal's capacity there, according to M. O. Matthews, executive vice president.

With capacity of 5.5 million bbl. a year at Ada, Ideal will be able to produce more cement there annually than Oklahoma has ever used in one year. The Ada unit will become the largest in Ideal's system.

A fully centralized system of controls gives operators full command of all production facilities. Equipment for direct overhead bulk loading is fast and efficient—more than 40,000 bbl. can be loaded in a single shift. A 5.5 mile conveyor system between quarry and plant reportedly will be the longest permanent conveyor ever constructed. Extensive systems of dust collectors have been installed throughout the plant.

Asbestos expert authors "Inorganic Fibres"

A NEW BOOK by C. Z. Carroll-Porczynski, noted authority on asbestos, was published recently in the United States by Academic Press, New York City. The book, titled *Inorganic Fibres*, also was published in London by National Trade Press, Ltd.

Asbestos, glass, minerals and metals are covered in *Inorganic Fibres*. Industrial uses and processes are discussed fully, with special attention to recent developments in the asbestos industry. Modern inorganic fibers are entering traditional asbestos fields and are being combined with asbestos in the development of new products. The author describes many of the products made from these materials.

Inorganic Fibres has 350 pages, 157 illustrations, numerous tables and references and an author and subject index. It is available at $11 per copy. Inquiries should be sent to Academic Press, 111 Fifth Ave., New York, New York.

Lake Ontario offers new stock to share owners

AN ISSUE OF 671,376 common shares and an equal number of common share warrants was offered to shareholders of Lake Ontario Portland Cement Co., Picton, Ontario. The proceeds of the sale were to be used for the payment of interest due December 31, 1958, the reduction of the company's bank loans and for certain capital expenditures.

A unit consisting of one common share and one common share warrant was offered to the common shareholders in the ratio of one unit for each two shares held of record November 25, 1958. The subscription price was $2.25 per unit payable in either Canadian or U. S. dollars. Additional subscription privileges, subject to allotment, were also included. The added stock offer expired December 12, 1958.

Combined subscriptions and oversubscriptions under the offering exceeded 444,445 units, the minimum number required to make the offering effective. Any unsubscribed units may be offered by the company's agents, Kidder, Peabody & Co. and Nesbitt, Thomson & Co., Ltd.

The common share warrants are fully transferable separately from the common shares and entitle holders to purchase common shares at a price of $2.50 to December 31, 1959, $3 to December 31, 1961, $3.50 to December 31, 1963, and $4.50 to December 31, 1966.

The company's $16-million plant at Picton began commercial operations in April, 1958. It reached full production rate of 1.6 million bbl. in July.

Booklet on cement standards available

A BOOKLET TITLED *Review of Standards for Cements Other Than Portland, 1958*, has been published by Cembureau, The Cement Statistical and Technical Association, Malmo, Sweden. In 1955 a *Review of Portland Cement Standards of the World* was published by the association. During the preparation of this review and after its publication, numerous inquiries and suggestions were received which seemed to indicate that there existed a genuine need for a similar review covering other types of cement.

In the present 164-page review, the same principles have been followed in the arrangement of the data as in the earlier publication. Information on the requirements imposed by the specifications of the various countries is given in both text and tables.

The booklet is available in English at the price of 30 shillings ($4.20) per copy from Cembureau, The Cement Statistical and Technical Association, P.O. Box 245, Malmo, Sweden.

Phosphate companies fight air pollution

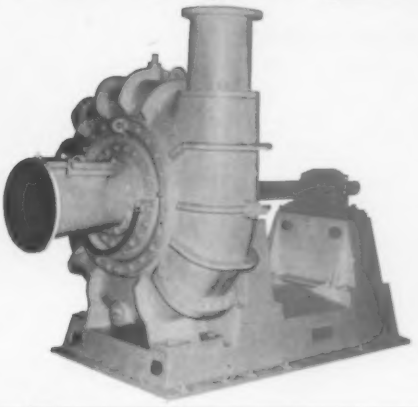
THE PHOSPHATE INDUSTRY in Florida's Polk and east Hillsborough counties will have an estimated $7 million invested in modern waste control equipment by mid-1959, an industry representative told the National Conference on Air Pollution. Howard F. Roderick, vice president in charge of the Phosphate Chemicals Division of International Minerals & Chemical Corp., said that operation of such equipment amounts to $250,000 annually for his company alone.

Several major phosphate producers in the area recently joined together in an industry research program on the air pollution problem in the Polk and east Hillsborough county region, Mr. Roderick said. Resources Research, Inc., Washington, D.C., has been retained to conduct the research.

(Continued on page 62)

Another Customer Speaks

His Experience With THOMAS PUMPS Covers Period of the Last 5 YEARS



Kanawha Sand Company, Parkersburg, W. Va., goes on record as a satisfied user of their Thomas DURABLE Dredge Pump, which has been in service since late in 1953.

Kanawha Sand Company is pleased with their Thomas Pump on account of its extremely long life. All the working parts of this Thomas Pump are made of GENUINE Dependable Thomas Ni-Hard. This material plus the unique design of Thomas Pumps is responsible for the installation of hundreds of Thomas Pumps the past few years in all sections of the country, replacing pumps of many different makes.

Actual production experience of Thomas customers proves over and over again the Thomas slogan, which has become axiomatic:

"YOU CAN NOT BUY AT ANY PRICE A MORE DURABLE PUMP FOR SAND AND GRAVEL. YOU CAN NOT BUY ONE THAT WILL MAKE YOU AS MUCH MONEY."

Available in range of sizes from 6" to 16" discharge

Above: Series NOL, 15", Thomas Pump as used by Kanawha Sand Co.

Below: Kanawha Sand Company dredge "West Virginian", equipped with Thomas DURABLE Dredge pump since 1953.

KANAWHA SAND COMPANY
OHIO RIVER WASHED SAND AND GRAVEL

TELEPHONE HU 5-5481
PARKERSBURG · W · VA ·

October 21, 1958

Thomas Foundries
Birmingham, Alabama

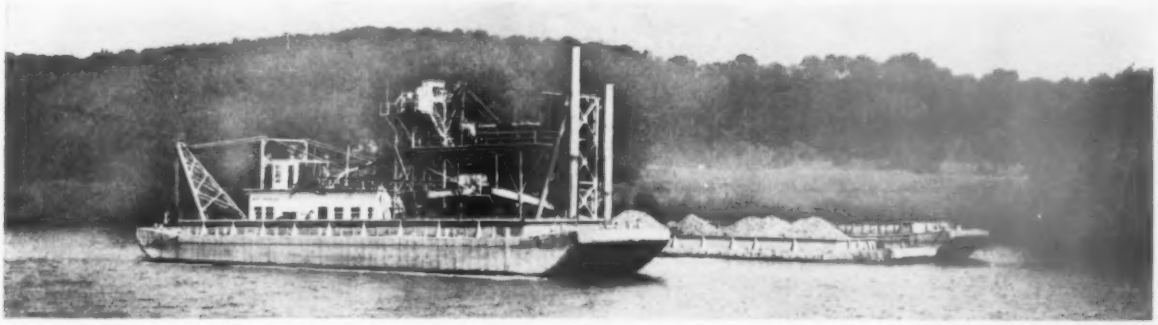
We are enclosing a photograph of our dredge West Virginian. This dredge is equipped with a Thomas series NOL pump adapted for a 16" suction and 14" discharge. We also use a Thomas trash separator which aids greatly in producing quality material.

We produce an average of 400 tons of finished product per hour of digging, and since the pump was installed in 1953, we have used only two Ni-Hard shell liners and few other parts.

Very truly yours,

J. T. Oakley
Executive Vice President

JTW:mhn
Enc.



THOMAS FOUNDRIES Inc.
P. O. Box 1111, Birmingham, Alabama

Enter 1050 on Reader Card

INDUSTRY NEWS

(Continued from page 60)

NYC board gives approval to Aglite

THE NEW YORK CITY Board of Standards and Appeals has approved Aglite, a synthetic lightweight aggregate, for use in structural and fireproofing concrete in buildings and other structures. Produced by the 108-year-old Sayre & Fisher Co. of Sayreville, N.J., Aglite is an expanded clay aggregate.

Aglite currently is being used widely in the manufacture of lightweight concrete block and other building products including prestressed concrete, monolithic concrete and precast wall, roof and floor systems.

At Sayreville, 26 miles from New York City, Sayre & Fisher operates a new, modern, fully automated Aglite plant which cost $1.5 million. Said to be the largest of its kind in the world, it has a daily capacity of 1,500 cu. yd. The company also has licensed a plant near Minneapolis, Minn., with a capacity of 750 cu. yd. per day.

Pennsylvania Glass Sand acquisition approved

SHAREHOLDERS OF Industrial Silica Corp. approved acquisition of the company by Pennsylvania Glass Sand Corp. through an exchange of stock. Under the plan, one share of Pennsylvania Glass Sand common will be traded for each 2¾ shares of Industrial Silica. Both companies mine and process silica and silica sand for industrial use. The transaction has been approved by directors of both firms and does not require Pennsylvania Glass Sand shareholders' approval.

Fluorspar production

DOMESTIC MINE PRODUCTION of crude fluorspar ore totaled 197,900 short tons in the second quarter of 1958 and mills processed 206,400 tons from which 84,700 tons of finished fluorspar were recovered. Total production of finished fluorspar was 90,200 tons which included 5,500 tons of material marketable as mined. Shipments of finished fluorspar, including some material marketable as mined, totaled 83,500 tons valued at $3,815,600, according to reports of producers to the Bureau of Mines, U. S. Department of the Interior. Imports for consumption in this quarter were lower than those made during the previous quarter. Consumption of fluorspar again fell from the previous quarter.

(News continued on page 64)

Knuckles right down to any job!

This rugged heavyweight asks no quarter, it just wades right in and polishes off tough hauling jobs. Two high-capacity "live" rear axles give it better flotation and traction on soft ground. And its 234-hp. engine, with dual carburetors standard, gives this T900 tractor the big-chested power to handle the big hauling jobs without tiring.

The new Dodge tandems are packed with features that make heavy-duty hauling easier and more profitable: New instrument clusters, with tachometer and graduated ammeter and oil pressure gauges standard . . . suspended brake and clutch pedals . . . 90-degree-opening hood for easy servicing . . . air brakes standard on T900 models . . . up to 20 speeds forward. But see your Dodge dealer—and get the *heavy-duty* reasons why . . .

today,
it's real smart
to choose **Dodge Trucks**

Built throughout for dependable heavy-duty service, this 354-cubic-inch V-8 has dome-shaped combustion chambers . . . double rocker-arm shafts . . . precision timing gears instead of chains . . . positive exhaust-valve rotators . . . hydraulic tappets . . . sodium-cooled exhaust valves. And it develops full power on thrifty *regular* gas!

Enter 1101 on Reader Card

INDUSTRY NEWS

(Continued from page 62)

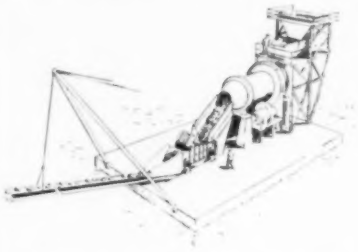
Pettinos loan fund established at Lehigh

CONTRIBUTIONS TOTALING $2,000 to establish the George F. Pettinos Memorial Fund at Lehigh University were announced November 20 by Elmer W. Glick, university treasurer. The fund is being started with gifts from members of the family and business associates in memory of the late George F. Pettinos, an alumnus of Lehigh with the class of 1887, who died February 22, 1958.

Income earned on the principal of the new fund will be used to grant loans to students for tuition and fees through the university's committee on scholarships and loans. Repayments of the principal and interest on loans to students are also to be used to grant similar loans to students.

Mr. Pettinos, who died at the age of 96, was Lehigh's oldest alumnus. He founded George F. Pettinos, Inc., a graphite and silicon business, and developed it into world prominence.

Floating plant will clean phosphate in West Africa



WHAT IS SAID TO BE the world's largest rotary ore scrubber for cleaning phosphates—over 35 ft. long and 11½ ft. diam.—has been purchased for a French West African company through the French distributor and licensee for Allis-Chalmers International, it was announced.

The scrubber, to be delivered in the spring of 1959 to the Senephos Co., Senegal, French West Africa, will constitute the major component of a floating phosphate plant and will remove clay and slimes from approximately 400 metric tons per hour of 20 in. x 0 phosphate ore feed.

In operation, the cleaning plant will be fed by a 7½-cu. yd. dragline mounted on a separate barge. The scrubber will discharge through its cone-shaped end across a stationary grizzly onto a 6 x 16-ft. vibrating screen. Fines from both the grizzly and screen will be minus 2½ mm.

Crushed stone plants post good safety record

THE OVER-ALL INJURY EXPERIENCE at crushed-stone operations participating in the National Crushed Stone Association Safety Competition of 1957 was one of the best in the 32-year history of the contest, according to the Bureau of Mines, U. S. Department of the Interior. Injury records have improved over the competing years, and in 1957 both the severity and frequency of injuries were lower than in the preceding year.

The injury-severity rate of 1,097.-040 days lost per million man-hours worked in 1957 is the second lowest in 32 years of competition; the lowest was in 1945, when the rate was 1,093.-384. The 1957 rate was a 75 percent improvement over the rate of 4,358.-784 in 1956, and a 78 percent improvement over the 32-year over-all severity rate of 4,875.722. In 1957, the injury-frequency rate was 18.458 per million man-hours of exposure to hazard, or 2 percent less than the similar rate of 18.809 in 1956 and 33 percent less than the 32-year rate of 27.347.

Highest safety honors in the 1957 National Crushed Stone Association Safety Competition were won by the Clinton Point quarry of the New York Trap Rock Corp. at New Hamburg, N.Y. This dolomitic limestone quarry won the bronze plaque provided by *Explosives Engineer* magazine for the outstanding safety accomplishment of having operated 374,800 man-hours without a lost-time injury during 1957. In 1957 this plant had, for the first time, the best safety record of all competing operations. The Clinton Point quarry has been enrolled in the competition for 12 of the 32 years.

The Kingston No. 3 quarry of Callanan Road Improvement Co., Kingston, N.Y., ranked second in the competition with 301,560 man-hours worked without a lost-time disabling injury. The Tomkins Cove, N.Y., quarry of New York Trap Rock ranked third with 264,500 man-hours of exposure without any injuries. Forty-two other plants had injury-free records in 1957 and were awarded certificates of honorable mention by NCSA.

(News continued on page 66)

Special report to Caterpillar owners:

CAT CATERPILLAR

Parts you can trust. Dependable, round-the-clock service.

PROOF OF THE DIFFERENCE IN THE CAT "HI-ELECTRO" HARDENED CUTTING EDGE

Whether loading scrapers or bulldozing, the cutting edge takes more punishment than any other part of the machine—more punishment today than ever before. New, larger, more powerful machines put greater demands on cutting edges. And the edge that's holding up best and lasting the longest is the Cat "Hi-Electro" hardened cutting edge—the edge with the difference. From all over the country, documented results from on-the-job comparative tests with other makes of edges confirm this fact. The best buy is the Cat edge.

ROUGH JOBS like this put cutting edges to severe tests. And here is where tough Caterpillar edges prove their superiority.

• • •

Field tests prove that the edge with the difference, the Cat cutting edge, not only outwears other make edges of the same thickness; it even outlasts the thicker edges of other manufacturers. The reason: Caterpillar engineers perfected a hardening process to give steel the right blend of toughness and hardness—toughness to prevent breaking, hardness to prevent bending and rapid wear.

• • •

Quality edges start with quality steel, tested in Caterpillar's laboratories for the right chemical composition and physical characteristics. Only steels meeting these exact specifications are accepted, and further tests are made at every stage of production.

CROSS SECTION of edge showing armor-like case and its shock-absorbing core.

NOW AVAILABLE—NEW MULTI-SECTION 'DOZER EDGES

New multi-section 'dozer edges developed by Caterpillar for the D8 and D9 show the way to reduced blade costs and easier blade changing. Reduced blade costs can result from piece-by-piece replacement. You can now reverse and replace the worn sections. Changing is easier than ever before.

• • •

Service tip: When installing new or reversing "Hi-Electro" hardened edges, clean all dirt from the matching surfaces. Be sure that all bolt heads are properly drawn in to their holes and correct nut torque applied. This assures proper cutting edge support and maximum strength.

• • •

Your Caterpillar dealer has the complete story on the advantages of using new Cat multi-section 'dozer edges. Remember, he'll carry your parts inventory. See him today!

NEW EDGES are now available for the D8 Bulldozer in left and right sections shown here. New edges for the D9 come in left, center and right sections.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

(Continued from page 64)

Ohio Gravel Co. doubles dividend

DIRECTORS OF Ohio Gravel Co. doubled the 50-cent semiannual dividend and declared a 50-cent extra dividend. Both were payable to shareholders of record December 10, 1958. The $1 last-half dividend was payable December 20 and the 50-cent extra on January 20, 1959. In previous years dividend payments had been made annually.

The directors also voted to put the company on a quarterly dividend-paying basis. Ohio Gravel paid 50 cents a share at midyear to make the 1958 total $2, compared with $1.25 a year paid for the three preceding years. Fred W. Cornuelle, president, attributed the increase to better business and a decline in land purchase activities and other costs.

Pavement yardage

AWARDS OF CONCRETE PAVEMENT for the month of November and for the first 11 months of 1958 have been classified by the Portland Cement Association as follows:

	Sq. yd. awarded during November	1st 11 mos.
Roads	5,696,781	62,275,354
Streets and alleys	2,287,868	30,115,215
Airports	604,179	18,688,966
	8,588,828	111,079,535

Arkansas cement plant placed in operation

THE MODERN NEW PLANT of Arkansas Cement Corp. near Foreman, Ark., has been placed in operation. The first carloads of "Foreman Cement" were shipped in December.

W. R. Stephens, president and board chairman of Arkansas Louisiana Gas Co., said the initial orders went in bulk by rail to various parts of the plant's four-state primary trade area, consisting of Arkansas, north Louisiana, east Texas and east Oklahoma. Arkansas Cement is a subsidiary of the Shreveport, La., based gas firm.

The first shipments climaxed a series of test production runs begun in early December. Foreman Cement will be sold both in bulk and sack.

The new plant, with an annual capacity of 1.4 million bbl., will produce all the main types of portland cement as well as masonry cement. Built by Kaiser Engineers, Inc., it is one of the most modern plants in the U. S. It required a little over a year to complete and employs about 100 persons.

Aggregates firm may lose acquisition

A FEDERAL TRADE COMMISSION examiner recommended that Erie Sand & Gravel Co., Erie, Pa., be ordered to divest itself of the Sandusky division of Kelly Island Co. acquired in 1955. Examiner Abner E. Lipscomb, whose decision is subject to review by the full commission, declared the acquisition violated the antitrust laws by giving Erie a potential monopoly of the lake sand market on the southern shore of Lake Erie.

Erie's acquisition of Sandusky, Mr. Lipscomb ruled, gave the combined company nearly 92 percent of the lake sand market on Lake Erie's southern shore extending from Buffalo, N.Y., to Sandusky, Ohio, and up to 12 miles inland. Prior to the merger, Mr. Lipscomb said, Sandusky was the largest producer of lake sand in this area, controlling 54.5 percent of 1954 domestic production. Erie ranked second with 37.3 percent, he said.

In addition to obtaining a potential monopoly, the examiner said, Erie received these other competition-lessening benefits:

—Became the only distributor of lake sand in the port cities of Dunkirk, N.Y., Sandusky and Erie, and the only producer selling in every port in the entire area.

—Increased its dredging equipment from one vessel to four and acquired docks—a necessity to a lake sand producer—in every major area port.

—Eliminated an independent competitor by prohibiting Kelly Island from re-entering the market for at least 10 years.

Erie, defending the acquisition which was estimated to have cost more than $1 million, argued that the lake sand market could be considered in the light of competition from pit and bank sand. Mr. Lipscomb rejected this argument because, he said, lake sand is generally of finer quality than pit or bank sand and more consistently meets government-project specifications. The examiner also denied Erie's contention that the southern shore of Lake Erie should not be considered a relevant section of the country under the antitrust laws.

National Gypsum may get Huron Portland Cement

NATIONAL GYPSUM CO. will acquire Huron Portland Cement Co., Alpena, Mich., if stockholders of the cement firm approve. This was announced December 29 by National Gypsum after directors of both firms agreed to the plan.

The acquisition would be made by exchanging all of Huron's stock for 1,014,300 shares of National Gypsum. It would give the gypsum firm a cement division to add to its gypsum, lime, asbestos, paint, insulation and ceramics operations, and would make it a supplier to the growing federal highway program.

Huron's plant at Alpena is believed to be the world's largest, with annual capacity of 12 million barrels. The firm is about tenth largest of more than 50 U. S. cement makers.

National Gypsum chairman Melvin H. Baker, in making the announcement, said that Huron's present management would continue to operate the firm.

(News continued on page 71)

Two revolutionary insulating techniques

New motor development obsoletes today's application practices!

Only from Allis-Chalmers!

***Super-Seal* motors save up to 60%**

Here's an amazing advance in motor technology! It's the *Super-Seal* motor line — an open motor design so completely unaffected by moisture, dust, dirt, oil, acids and alkalies that it can be used in many applications previously requiring more costly enclosed motors. *Savings range from 15 to 60%.*

Super-Seal motor superiority results from two distinct revolutionary insulating techniques. Available in any integral horsepower size, smaller *Super-Seal* motors incorporate a *Poxeal* stator. A durable epoxy resin encloses the stator, creating an electrical system impervious to outside elements.

In larger sizes, *Silco-Flex* insulation is used. In this system, silicone rubber is vulcanized into a homogeneous mass to form a flexible, moisture and heat resistant, void-free dielectric barrier around coils and leads.

Both of these insulation systems are unsurpassed. Proof? An encapsulated motor ran for hundreds of hours at full load in a 4% brine solution.

Find out more by reading the next pages; then contact your A-C representative or distributor, or write Allis-Chalmers at address shown on back page.

ALLIS-CHALMERS

51B-9100

easily meeting Class H temperature

CHRYSLER KIMBERLY-CLARK GOODYEAR
SOUTHERN CEMENT CONTINENTAL CAN

Two revolutionary insulating techniques developed and pioneered by Allis-Chalmers mean savings of millions of dollars for motor users . . .

New open motors are unaffected by moisture and contaminants

Modern insulating materials and new methods of application, now available in *Super-Seal* open-type motors, are drastically changing motor application standards. These insulations are so completely impervious to moisture and contaminants that *Super-Seal* open motors can be used in most applications formerly requiring costly enclosed designs. Existing applications have resulted in savings as high as 60%.

Basic insulation systems

Larger *Super-Seal* motors with form-wound stator coils use the *Silco-Flex* insulation system. Heart of this system is a remarkable rubber-like silicone elastomer, applied in semi-cured state and vulcanized to form a void-free, impervious dielectric barrier. More than four years of development and field testing have proven the superior electrical and physical properties of *Silco-Flex* insulation systems.

Stator coils of smaller random-wound motors are protected by equally effective *Poxeal* insulation system. A tough, durable case of epoxy resin completely seals the winding end turns and slot portions. Bonded to the stator laminations, it forms a seal completely impervious to contaminants.

Moisture resistance

In addition to being void-free, the silicone elastomer used in *Silco-Flex* insulation is moisture repellent. Even in high humidity, moisture does not form a surface film of condensation. Coils with this protection can operate completely immersed in water. In fact, one of the recommended cleaning procedures is use of detergent and water.

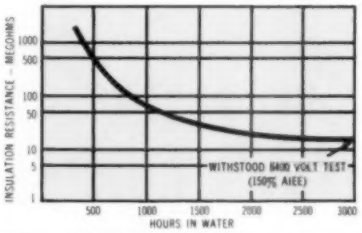


Fig. 1—Test curve shows insulation resistance of *Silco-Flex* insulation while immersed in water.

Moisture resistance of *Silco-Flex* coils is demonstrated in Fig. 1. After more than 3000 hours of total immersion with 2300 volts impressed on the coil, the test was terminated when it became apparent that little more drop could be expected in the coil's insulation resistance. At that point the coil still withstood a high potential test of 8400 volts without injury.

Encapsulated stator windings are equally well sealed. Motors with *Poxeal* insulation protection have been thoroughly tested under water while operating with full load and full voltage.

Resistance to contaminants

Silicone elastomers and epoxy resins are relatively inert to attack by practically all reactive agents. Further, the void-free construction of insulation systems used in *Super-Seal* motors prevents penetration of contaminants. As a result, *Super-Seal* motors are unaffected by oils, most acids, salt solutions, alkalies, and oils and are ideally suited for such applications.

Thermal stability

Temperature-wise, *Silco-Flex* insulation can easily withstand hot-spot temperatures of 200 C and more—

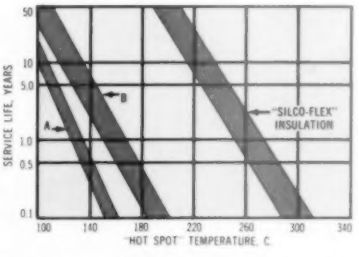


Fig. 2—Chart shows that *Silco-Flex* insulation more than meets Class H requirements.

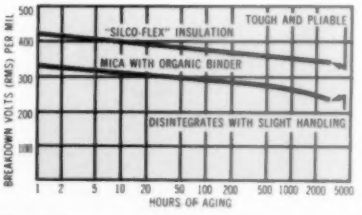
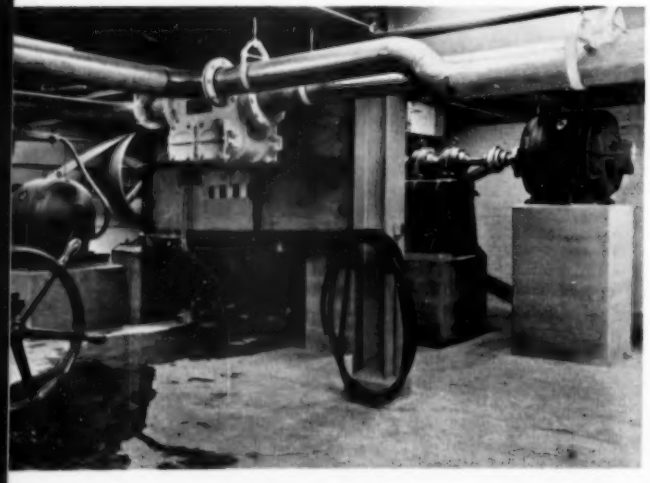


Fig. 3—Tests of 2300-volt insulated bars show thermal stability of *Silco-Flex* insulation.



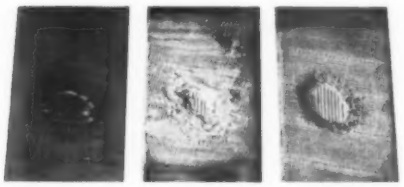
Paper mills have wide application for *Super-Seal* motors because of moist atmospheres.

easily meeting Class H temperature requirements (Fig. 2). At temperatures where the life of Class B coils would be measured in weeks, the life span of *Silco-Flex* coils is well beyond machine obsolescence.

Comparison with a mica-organic binder insulating system (Fig. 3) offers further proof of thermal stability. After 2000 hours of aging at 200 C with 8500 volts applied continuously, the *Silco-Flex* insulated coil was still tough, pliable, and completely serviceable. The mica-taped insulation had deteriorated to the point where it disintegrated readily and was completely useless.

An added advantage of *Silco-Flex* insulation is unusually high thermal conductivity — about twice that of conventional insulations. This means heat dissipates faster from its point of generation.

Poxeal insulation also demonstrates remarkably good thermal stability. Materials now in use are suitable for Class B temperatures, although actual classification of the insulation is determined by the basic material used.



Silco-Flex Insulation | Polyester Mica Tape | Asphaltum Mica Tape

Fig. 4—Samples of motor insulations after sandblasting give comparison of abrasion resistance.

Abrasion resistance

Resistance to abrasion is still another point of superiority in the insulation systems used for *Super-Seal* motors. Abrasion resistance of *Silco-Flex* insulation is compared to other types of insulation in Fig. 4. After one minute of sandblasting with 90-grit aluminum oxide and 100-psi air, only slight surface erosion appeared on the *Silco-Flex* sample. Other insulations were eroded to bare copper.

Application practices obsolete

The superior qualities of *Super-Seal* insulating systems, developed by Allis-Chalmers, make it necessary to reappraise present application practices. With virtually ageless insulation, *Super-Seal* motors assure more reliable service and require less upkeep than the best protected, conventionally insulated machines — and at considerably less cost.

Super-Seal, Poxeal, and Silco-Flex are Allis-Chalmers trademarks.

This *SUPER-SEAL* MOTOR application SAVED $3000!

Find out how much you can save

This application of a *Super-Seal* open-type motor — in place of a weather-protected design of the same rating — *saved the user $3000.00!*

You can achieve similar savings! Fill out the data sheet below and *find out for yourself how much you can save — on a "no-strings-attached" basis.*

Here's what to do: 1) Select an enclosed motor application in your operations (a new motor need or, for comparison, a motor just purchased); 2) fill out the data sheet; 3) mail to the address shown.

We'll give you a cost quotation on a *Super-Seal* open motor for that application.

Fill out this data sheet—

no strings attached—to find out how much you can save on a new motor or on an existing motor installation

To: **ALLIS-CHALMERS**
888 S. 70th St., Milwaukee 1, Wis.

Motor Data

1. Type (i.e., squirrel cage):

Horizontal ☐ Vertical ☐

Hp..... Rpm.....

2. Phase..... Frequency.....

Voltage.....

3. (For synchronous only)

Power factor.....

Starting torque.....

Pull-in torque.....

Pull-out torque.....

Application Data

4. Description of application:

5. Drive: Direct-connected ☐

V-Belt ☐ Other:.....

Starting load.....

Ambient temperature.....

6. Operating conditions:.....

Dirty ☐ Clean ☐ Wet ☐ Dry ☐

Other.....

Information on Existing Motors

(for comparison)

7. Type of insulation

Type of enclosure

Time rating.....

Temperature rise.....

Bearings:

Anti-friction ☐ Sleeve ☐

8. Special characteristics or construction:

NAME.....

TITLE.....

COMPANY.....

ADDRESS.....

A-5869

ALLIS-CHALMERS

INDUSTRY NEWS

(Continued from page 66)

Ideal Cement directors authorize stock split

THE BOARD OF DIRECTORS of Ideal Cement Co. authorized a three for one split in the shares of capital stock of the company, subject to approval by stockholders at a special meeting which was to be held January 16, 1959. The board also declared a cash dividend of 50 cents per share payable December 29 to stockholders of record December 12, 1958.

Under the proposed split, the authorized capital stock would be increased from 4 million shares of $10 par value to 12 million shares of $5 par value. Two additional shares would be issued on January 30, 1959, for each share held of record at the close of business January 26, 1959.

President Cris Dobbins announced that in the absence of any adverse conditions, management intended to put the stock on a 20 cents per share quarterly dividend basis. This would be equivalent to 60 cents a share on the former stock, on which 50 cents a share was paid quarterly. Dividend action for the first quarter of 1959 will be considered at a meeting of directors on February 24.

Shale plant planned in Montana

A $250,000 PLANT to process gray shale is planned by Treasure State Industries three miles north of Great Falls, Mont. The processed shale will be used as aggregate in prestressed and precast concrete. J. Brad Seely of Whitefish is president of the firm, which will be known as Treasure State Industries Products, Inc. Other officers are Frank G. Knight, Great Falls, secretary; J. E. Rafn, Lewistown, treasurer; H. W. Monahan, vice president and general manager. The directors are J. J. McCaffery, Butte, president of Treasure State Industries, Inc.; Tom J. Murray, Butte; William F. Stevens, Billings.

Keystone Portland Cement earnings dropped 17%

EARNINGS of Keystone Portland Cement Co. for the nine months ended September 30, 1958, were 17 percent less than those of the corresponding period of 1957. Net income for the 1958 period was $1,379,829; for the 1957 period, $1,661,006. Net income prior to 1958 was restated to reflect the change in the computation of percentage depletion.

END

Calendar of Coming Conventions

1959

February 15-19, 1959—
National Sand and Gravel Association, 43rd Annual Convention, Hotel Roosevelt, New Orleans, La.

April 6-8, 1959—
National Lime Association, Annual Convention, Homestead, Hot Springs, Va.

April 23-25, 1959—
Texas Aggregates Association, 5th Joint Annual Convention With TRMCA, Shamrock Hilton Hotel, Houston

June 21-26, 1959—
American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N.J.

September 13-18, 1959—
American Society for Testing Materials, Third Pacific Area National Meeting, Sheraton Palace Hotel, San Francisco, Calif.

September 27-30, 1959—
National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Lake Placid Club, Lake Placid, N.Y.

HINTS AND HELPS

Profit-making ideas developed by operating men

Pug mill breaks clay in sand and gravel

AN EASTERN sand and gravel producer found that as he went deeper into a deposit of sand and gravel it was almost impossible not to bring up some of the clay bottom in the pond. The clay balls would then really gum up his truck dump hoppers, chutes and conveying equipment.

The ingenious answer to this sticky problem proved to be the installation of a pug mill—one taken right off a hot-mix plant for bituminous concrete. This twin-shaft paddle mixer had been designed heavy enough to handle batches of stone and asphalt, and it was plenty rugged to handle the toughest clay balls. Clay is still a problem in the equipment, but it seldom gets heavy enough to stop operation, thanks to the old pug mill.

Conduit serving as handrail is accessible

WHEN AN EASTERN sand and gravel producer built a new plant, he wanted to make his equipment as accessible as possible for easy inspection and maintenance. As a result, even the electrical system is right out in the open—a contrast to many installations where the wiring and conduit are often concealed in hard-to-reach locations.

The handrails on this conveyor are made up of conduits which carry the wiring for the motors, screens and lights in the tower in the background. It's seldom any problem in this plant to locate the source of electrical difficulty. The whole system is right out where it can be inspected at a glance. The price of a handrail is saved.

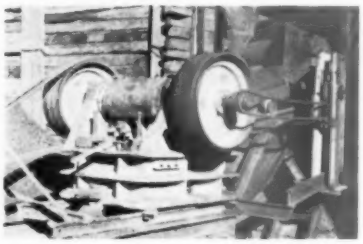
Old chains, new uses

CONVEYOR AND ELEVATOR CHAINS are not used around aggregates producer's plants as much as they were before belt conveyors were so widely used. Even so, there are plenty of plants with an accumulation of worn-out chain. One of these is an eastern sand and gravel producer who has found several novel uses for the piles of links around the plant.

The transfer point of each belt conveyor has six or eight strands of heavy elevator chain which have been hung into the hopper to break the impact of the material against the steel sides. Each vibrating screen has a curtain of these chains above it to prevent the materials from overshooting the screen and to help to spread the flow of sand and gravel across the screen deck.

Pairs of links are used as hinges for steel doors and removable covers. The steel sidebars of the chains are tack welded to the steel plate or support, and the chain pin makes a rugged, substantial hinge pin.

Extra drives cost money



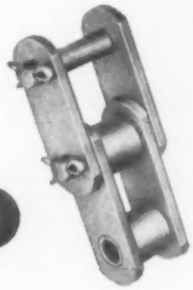
ONE OF THE MOST PROFITABLE areas for trying to save real money in the operation of practically any kind of machinery is to eliminate a motor with its enclosed reducer and any chain reductions that it has.

A western producer of volcanic ash made some savings by connecting his belt feeder and vibrating grizzly to his jaw crusher. The power requirements of these two small pieces of equipment are so minute that the crusher motor handles them easily. The savings: elimination of separate motors, controls and reducers.

(Continued on page 74)

"Full-round" design of Link-Belt LXS chain avoids stress raisers

ROLLERS are accurately machined for correct operating clearances and free-rolling action.



SIDEBARS of selected steel have accurately machined "full-round" pitch holes, which maintain firm, tight press fit of pins and bushings.

FOR POWER TRANSMISSION, LXS chain is generally supplied with offset sidebars. Uniform stress distribution provides extra chain life and safe dependable operation.

FOR CONVEYING AND ELEVATING, LXS chain with straight sidebars and rollers to meet varied operating conditions. A wide variety of attachments is available.

"FULL-ROUND" PINS are made from a tough steel, specially treated for high strength in shear . . . sized for controlled press fit to prevent rotation in sidebars.

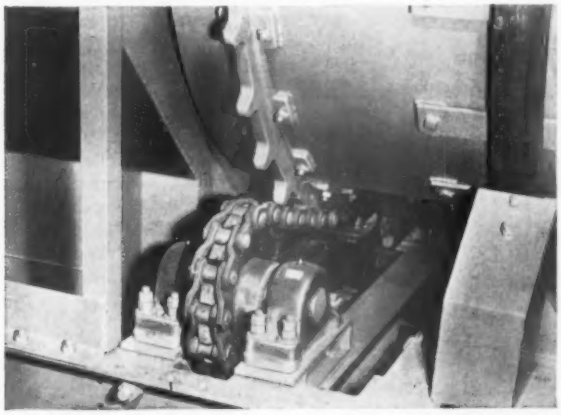
"FULL-ROUND" BUSHINGS are properly hardened to shrug off shock, resist wear . . . accurately sized for controlled press fit to prevent rotation in sidebars.

Greater live bearing area extends life

Stress concentration points are eliminated in Link-Belt LXS chain! "Full-round" design avoids sharp corners which may be the starting points of chain failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly . . . long chain life is assured under severe conditions.

Pins and bushings of LXS chain are accurately sized . . . assuring controlled press fits, preventing rotation in sidebars. Similar accuracy in machining of sidebars permits close control of pitch and proper chain length after assembly.

Other long-life features of Link-Belt LXS chain include use of selected steels and controlled hardening of all parts. Both contribute to greater endurance . . . greater uniformity.



LXS drives stand up to impact and abrasive service

Large, live bearing area makes LXS chain ideal for exposed drives and abrasive conditions such as found on this heavy rotating drum. Uniform distribution of load over ample bearing area reduces cutting action of abrasives . . . extends chain life.

LXS chain has stamina required for long, heavy-duty conveyors

With its exceptional strength and wear resistance, Link-Belt LXS chain can easily meet rugged conveying and elevating requirements. Due to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life necessary for the extra-long conveyors so important to today's highly mechanized industry.

HEADQUARTERS for chains, sprockets and other Link-Belt products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Refer to the Yellow Pages of your local Phone Directory.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,730

Enter 1018 on Reader Card

HINTS AND HELPS

(Continued from page 72)

Protect chutes and hoppers

AS MATERIALS HANDLING belts are run faster, the greater velocity of materials they discharge starts to become destructive to chutes and hoppers. When top speeds of belts were less than 200-fpm. material velocity was no problem. But materials coming off of belts travelling 300 to 500 fpm. can damage chutes and hoppers unless special care is taken.

An eastern rock products producer increased the capacity of his belt conveyors by stepping up the speed, and found that the crushed stone quickly battered the light steel chutes. To overcome this problem, the maintenance engineer mounted a couple of broken tire carcasses on a 6-in. pipe suspended in the throats of discharge chutes.

There's enough resilience left in the tires to absorb a lot of destructive punishment and to protect a scalping screen directly below. The tires do not last too long, but then they were only scrap to start with and are easily replaced. *Courtesy National Crushed Stone Association.*

Shine those trucks

HERE'S HOW A CANADIAN asbestos producer scrubs down his big trucks. It's not an easy or pleasant job to wash 18-ton end-dump trucks, particularly during the cold Canadian winter, but the extra effort pays off in reduced repair bills.

A thorough wash-down in a garage right next to the maintenance shop is the first step in the schedule for any truck that is to be inspected, maintained or repaired. A clean truck is not only easier for the shop men to work with, it makes it easier to detect minor defects which might be concealed under layers of the rich mud around the quarry. At the same time, it is now impossible for the dirt or mud to interfere with overhauling the engines or to contaminate exposed machine surfaces during repair jobs.

Steel saves wood

WOOD CONSTRUCTION may be best, but often the economies of installation are offset by the expense of maintaining the structure. However, one producer found this way to save wear and tear on his wooden hopper.

He salvaged a number of tractor shoes from his scrap pile and bolted them to his wooden chutes and hoppers at the points of greatest wear. The heavy steel shoes are virtually indestructible and add years to the life of his inexpensive wooden structures.

Try the friction check

AFTER ADJUSTMENTS have been made in the bearings or moving parts of engines, motors, screens and crushers or any of the big equipment in rock products plants, it is difficult to determine if the exact adjustment has been made.

The most frequent method of checking the tightness or looseness of the takeup in a bearing, stud or nut is to "feel" the heat of the housing. This rough and ready method depends upon the operator's judgment and recollection of the temperature before the adjustment was made.

A better method can be applied which has been used in a number of producers' plants: Note the exact time it takes for a machine to come to a stop after switching off the power. Then note the time it takes after an adjustment or repair has been made. If this fact has been recorded it will prove to be invaluable when repairs are made.

The stopping time for any piece of equipment can be a useful bit of information in checking its performance. An increase in stopping time may indicate damaging wear in the moving parts, or it may indicate a failure of the lubrication system in time to make repairs before failure of expensive bearings.

W. F. Shaphorst
Newark, N. J.

END

Pave your sluiceways, eliminate pipes

ROCK PRODUCTS PRODUCERS have developed a lot of ingenious ways of building trough and pipe flumes to handle their tailings and waste water from washing plants to settling ponds. One eastern producer hit on a way of eliminating steel pipes or troughs entirely. This was the result of the overwhelming prospect of installing and maintaining a system to handle more than 4,000 gpm. of waste water to tailing ponds ¼ mile away.

The quick and simple answer to the problem was to pave part of the sluiceway with bituminous concrete. Even after a few months of operation, the system shows every sign of being a huge success. It was inexpensive to put in, it shows not the slightest sign of abrasive wear, and if it does, it can be quickly and cheaply repaired.

Eventually the paved troughway will be extended right up to the discharge from the classifiers and cyclones. If the flow of waste water ever needs to be rerouted it will be a simple matter to put down a new pavement and to remove the old.

LONG OR SHORT HAUL. Barber-Greene Permanent Conveyors are available for every handling requirement. Write for 192-page catalog.

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Built of standardized components, Barber-Greene Permanent Conveyors are delivered and erected faster. They give top performance, yet require less engineering, and they are easily altered to meet changing or expanding requirements. Standardization also means readily available spare parts.

Barber-Greene Portable Conveyors handle all bulk materials. Pneumatic tires give fast travel between jobs. Swivel wheels allow building of high-capacity radial stockpiles. Line shaft and gear reducer drives eliminate troublesome chains and sprockets. Rugged construction assures long life and low maintenance. Lengths to 60 feet or more. Complete line of accessories.

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Rock Products
FEBRUARY, 1959

The highway aggregates program

by Warren D. Fish,
as told to Joseph N. Bell

Author Warren D. Fish, above, has been in highway work almost from the beginning of paved highway systems in this country. Born in South Dakota, he studied architecture and civil engineering at South Dakota State College. After graduation, he joined the Army, took part in the Mexican border warfare against Pancho Villa, then served in France with a field artillery unit in World War I. Returning from military service, he joined the South Dakota State Highway Department and has been connected with some phase of highway work ever since. After ten years as a highway engineer in South Dakota, Mr. Fish spent five years with the Missouri State Highway Department before he joined the Bureau of Public Roads in Washington in 1934. During his 25 years with the Bureau, he has served in their field office in several capacities, handled the controlled materials for highway work during World War II and the Korean conflict, took over direction of specifications and standard plans, and then moved up as chief of the Construction Administration Branch, Office of Engineering, Bureau of Public Roads, the position he holds today.

IF ROCK PRODUCERS are to enjoy the full benefit of better business as a result of the expanding highway construction program, they must: (1) take a broader look at aggregate sources and redouble efforts at conservation of existing sources and exploration of new ones; and (2) reverse the growing trend toward contractors moving into the rock products business.

The authority for these challenging statements is Warren D. Fish of the Bureau of Public Roads in Washington, D.C. They were made in a lengthy exclusive interview early in December with a ROCK PRODUCTS reporter. In this issue, Mr. Fish will deal with the problem of conservation; the remainder of the interview—concentrating on growing rock industry competition from contractors—will appear in the March issue of ROCK PRODUCTS.

Capital expenditures for highways in 1958 broke the $6 billion mark— an increase of 10 percent over 1957. Bertram D. Tallamy, Federal Highway Administrator, expects this figure to increase at a rate of 5 to 15 percent per year until 1962, when highway expenditures will hit an estimated $8.1 billion. Construction will be taking a steadily larger share of the highway spending dollar throughout this period.

The recent ROCK PRODUCTS annual survey showed that a majority of rock producers are looking to the highway market as the primary source of better business in years to come. This feeling appears to be completely justified by present highway prospects.

But there are problems—some of considerable magnitude—which enter this rosy picture. Mr. Fish is in a good position to see these problems clearly from his vantage point atop the federal highway program. If his view is necessarily limited, it is also clear and concise. So that his thinking is recorded as factually as possible, the interview is reported verbatim. Here is the first half, dealing principally with conservation of our aggregate resources.

Regional shortages are becoming more serious. What can be done? BPR's Warren Fish gives ROCK PRODUCTS his ideas

How large are the stakes for the rock products producers in this federal highway program?

During the next 13 years, more than 9,700 million tons of sand, gravel, stone and slag will be required to fill the needs of the highway program. These aggregate products, divided about 50-50 in value between those purchased by contractors from commercial sources and those produced by contractors with their own equipment and organization, represent about one-third of the cost of all the material required for federal highway construction program.

How is the federal-aid highway pie being sliced?

Here's how the highway construction dollar was divided in 1958: 45¢ for materials, 25¢ for labor, and the remainder for equipment and other costs of the contractor, plus his profit. Aggregates make up the largest single item of material purchased by the highway dollar. This includes aggregates used in ready-mix concrete and bituminous plant-mixes. Without benefit of the aggregate producers' segment of the materials industry, it is obvious that the highway program would be slowed down considerably.

In assessing the rock industry's portion of the highway construction dollar, will there be geographic differences?

Yes. My figures are based on a national average. In general, contractor-produced aggregates will represent a higher proportion of the total in the Midwest and Far West than in the East. Because of heavier traffic congestion and more urban development in the East, there is more bridge work and a necessity for wider pavements. In other parts of the country, more rural in nature, there will be more work for the grading contractor and paving firms because of longer road mileages and relatively fewer structures.

Are there areas where suitable aggregates simply aren't available for the enlarged federal road program?

One thing this road program has proved to us: There is no state where aggregate people should be too quick to say, "There aren't any suitable materials here." We're finding that by using rock materials wisely and by aggressive exploration, there are more materials than we had a right to suspect. This doesn't mean an over-abundance of satisfactory rock products all over the country; but it does mean that we shouldn't dismiss any possibilities without exploring them fully.

Specifically, where is the supply of aggregates insufficient to meet highway needs for the next 15 years?

Present indications are that the supply is not considered adequate in Colorado, Mississippi or Oklahoma. Florida has plenty for at least ten years. In Kansas the eastern third of the state has a good supply. Nebraska is short on crushed rock, New Hampshire on gravel and New York on fine aggregate and bankrun gravel. Oregon is concerned with its short supply in the southwest and northwest parts of the state. Pennsylvania's coarse aggregate in the northwest and fine aggregate in the central part of the state are dwindling, and Virginia has very little coarse aggregate in the Suffolk area. Other states have minor shortages of certain types of highway aggregates in small areas.

Is this shortage of suitable aggregates considered a serious problem as far as the highway program is concerned?

In some areas, yes. In other areas unless evaluated carefully it is likely to become serious because of the great requirements of the program.

What do you suggest should be done about this situation?

There are a number of things that can be done. Let me suggest a few of the most important here.

First, it is important that we be aware of the problem. Because the rock products industry is composed generally of local or regional businesses, it's difficult to get a real good look at the overall picture; yet it's very important that we all do so. Aggregates are being depleted at an alarming rate in some areas and with the highway program in high gear the problem will be accentuated. Some states that had a supply of good aggregates 15 years ago now are obliged to ship or truck them longer distances to places of use. The timber people found themselves in a similar situation not many years ago and because they had ignored conservation practices, timber supplies are practically exhausted in many parts of the country today. We must project the aggregates picture, not just look at it from a day-to-day standpoint. After all, we're in this energetic highway construction program for a long time to come. There is no

Warren Fish's list of 5 ways to ease the aggregate shortage:

1. **Be aware of the problem. Some states are short of rock now; others will be. Highway program needs 9.7 billion tons**

2. **Conserve—don't use a better grade of aggregates than necessary for the job**

Conserve aggregates *continued . . .*

foreseeable end to the growing demand for more highways.

Second, we've got to make the most economical use of the aggregates that are now available. We've told our engineers, "Re-evaluate your specifications for aggregates, especially in sub-bases. Don't use grades better than those that are really necessary to do the job properly." To use good concrete aggregates for sub-bases—just because they are close by—is wasteful of a critical resource. Often cheaper but fully suitable aggregates for sub-bases can be found on the fringes of the same site as the higher quality materials.

In some localities, the known supply of high quality aggregates is limited, and added sources are needed before it is exhausted. For other localities, quality aggregates already must be shipped in from outside sources. In either case costs are bound to be high and will continue to increase as the supply diminishes. Medium quality materials should be permitted for use wherever high quality materials are scarce and where the lower quality aggregate can be made to serve as effectively as high quality materials. A good example of this was the use of stabilized dune sand as sub-base under concrete pavement in one state to conserve higher quality gravel or crushed stone for use in concrete or high type bituminous pavement where aggregate of high quality is essential.

Third, where aggregates are plentiful but of low quality they can often be made suitable by treatment. The mixing of portland cement or lime with naturally unsuitable granular materials to reduce plasticity, or the blending of two aggregate sources to improve grading are two ways to upgrade these low quality materials.

Fourth, one of the most promising methods of conservation is the use of high-bearing-value materials for topping fills, thereby reducing the required thickness. Several states are already doing this successfully.

Fifth, the states should be encouraged to exert every effort to develop additional means of upgrading low quality materials and of locating new sources of aggregate supplies.

Is progress being made on the fifth point—that is searching out new sources of aggregates?

Excellent progress is being made in some states. Maine has been operating a soil survey for more than eight years. New Jersey and Rhode Island have complete cooperative soil surveys. Illinois and Pennsylvania are now working on one; so are North Dakota, West Virginia, Wyoming and Michigan. I'm sure other states are giving close attention to the problem, too. But there is still much to be done. States interested in making cooperative material inventories can apply for federal-aid funds for financing this type of study.

How do the states follow up on these exploratory borings?

Not all states react the same way on sites they have explored. Some operate the sites themselves, some secure options and then make them available for contractors to use at their election. Others prefer not to take the options; they just say to contractors, "Here are sources that have been tested and will be approved for roads in our state system. The owner says they are available at such-and-such a price." Then they let nature take its course.

So what happens?

There have been instances where states go into difficulties by securing options on aggregate properties. For example, in one southern state where borrow material was needed, the state made borings and came up with a material considered somewhat too expensive for the use to be made of it—but bought an option on the property anyway, figuring the material might have to be used no matter how much it cost to get it out. We ascer-

3. **Where plentiful aggregates of low quality are at hand, consider blending them, or try soil cement**

4. **Try high-bearing-value materials for topping fills to cut thickness needed**

5. **States must find ways to upgrade deposits and find new ones. State aggregate resources surveys help**

tained that the area had not been as thoroughly explored as it could have been and when further explorations were made suitable material was found at some other sites where it could be obtained at less cost. In this instance the state was left holding an option. Fortunately this doesn't happen very often.

But isn't all this tending to make aggregate producers of the states?

Yes, to some degree certain states are virtually being forced into the aggregates business. They would prefer not to get into it, and neither do we want them to. But in many localities it is absolutely essential that we and the states, in planning for highway construction, know where, what kind and in what quanitity aggregates are available so the road program can be carried on smoothly and economically. In the absence of anyone else to determine this information, the state makes borings and tests. Sometimes to avoid having the sites exploited, the state will buy up or option the area —which then puts them in the highway aggregate business.

Under such circumstances, does the Bureau of Public Roads prefer to deal directly with the states on reimbursement on federal-aid work for these sites?

No. As a matter of fact, our regulations require that normally a contractor is to furnish all materials that are put into the work. This means that the contractor must purchase from an aggregate producer or produce the material from sources of his own choosing, unless prior approval for other arrangements is given. When such arrangements are sought on federal-aid roads, we require that when the request for an exception is made, the price and source be clearly indicated, the material be made available at the same price to all contractors and that the successful bidder on the construction work is privileged to get the material from the state source. However, the contractor is not required to do so.

Soil cement is one way to get by with low quality rock. View of Interstate 30 in Texas shows substandard borrow in place, with cement being spread in background, mixed in foreground

Because of the magnitude of the interstate program, can we expect that most of the individual contracts will be increasingly larger?

By no means. The proportion between large, small and medium-sized contracts will remain just about as it has always been. The median sized federal-aid project is still only $100,000 because of the numerous secondary contracts still being let. But even eliminating secondary system projects, the median contract now averages no more than $250,000.

(Next month, ROCK PRODUCTS will report the second half of the interview with Mr. Fish. In it, he answers in detail the question: "What are your views on specific means by which rock producers might take better advantage of the highway construction program?" Watch for it in the March issue of ROCK PRODUCTS.) END

Chief electrician R. V. Muckendorf, center, gave the countdown just before the new plant elements came on the line. Careful planning meant every man knew his new equipment well, even though just put into operation. Two others facing camera are M. Oliphant, left, and W. J. Wimsett

Challenge: build new cement plant

Monarch Cement did it with only a 72-hr. shutdown during changeover. The new plant has a shale dryer, raw storage silos

by Elwood Meschter

THE CHALLENGE TO MONARCH CEMENT CO.: How to convert an obsolescent 8-kiln cement mill to a modern plant without loss of production. With a single operation and limited resources, Monarch could not hope to hold its position in an expanding market for cement unless it could maintain shipments during the conversion period.

The response to the challenge: It took 8 years and $12 million to make the changeover to an all new 3-kiln dry process plant. The program was completed in June, 1958, when the third kiln, new mills, new conveyors and waste heat powerhouse went on the line. Capacity of the plant has been increased more than 50 percent to 2½ million bbl.

The reasons for success: Careful advance planning of every phase of the conversion. Construction and installation of equipment were scheduled not to interfere with cement production. All employes were trained in the operation of new equipment as it was installed but in advance of its operation. As a result, less than 72 hr. of production time was lost.

A scale model of every area showed how each new building and piece of equipment could be installed without interfering with the continuous operation of existing buildings and machinery. The models were needed, too, to plan for removal of old buildings and equipment without disturbing the operation of newly placed equipment.

The training program was an essential part of the conversion plan. Monarch is one of the few cement plants to have a training director, and he is a key man in the operation of the new mill. Each production man had to operate the old equipment with which he was familiar right up to the time it was taken off the line. The next shift, he had to step right up to a new machine. He was able to do this with the benefit of training classes, instruction from manufacturers' representatives and a set of training manuals outlining design details

Firing end of shale dryer is shown here. The unit cuts moisture content of the shale from 12-14 percent to 1 percent

around old one

and operating instructions for each machine in every production department.

Unusual operating conditions at Monarch's eastern Kansas location encouraged the development of materials handling and design features not frequently found in cement plants.

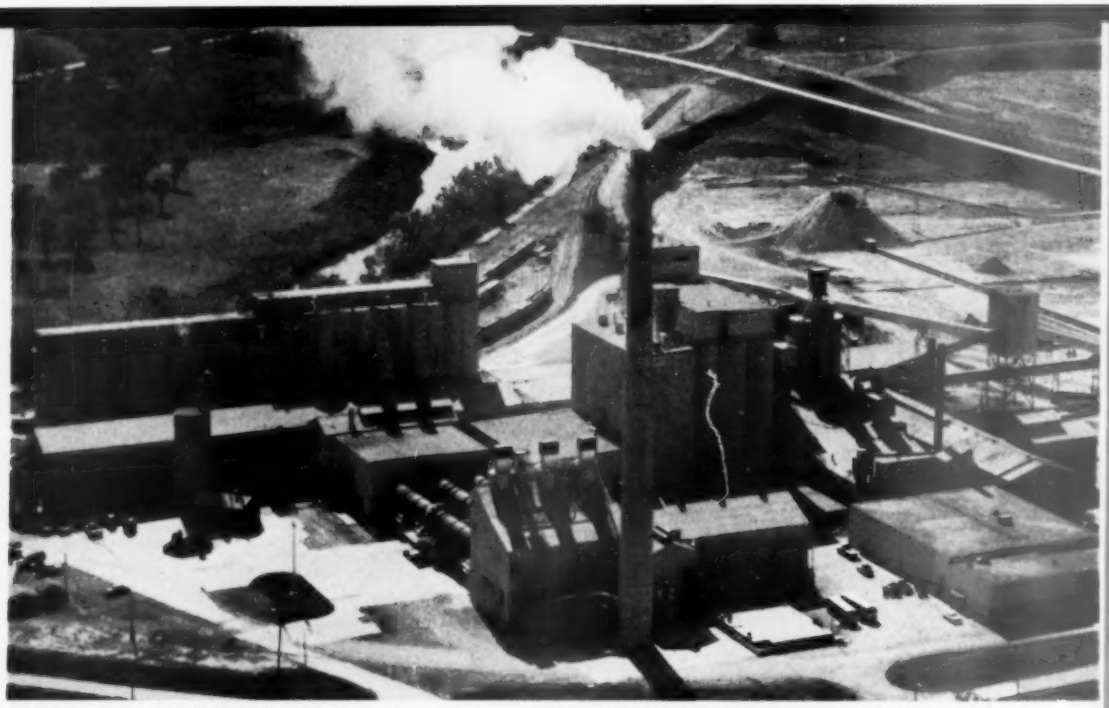
The location is about 100 miles south of Kansas City, in a rural location remote from supply houses. So the new plant was designed to be as self-sufficient as possible. An extensive storeroom stocks parts for every piece of equipment in the plant. A well-equipped machine shop can make repairs to keep the plant in production during almost any emergency.

Half a century ago, when Monarch was just getting started, the sources of electric energy were not as reliable as they are now. Waste heat boilers and generators were installed then to help keep the plant self-sufficient for its steam and energy needs. Even though power is now completely dependable, the management was reluctant to abandon the know-how and the flexibility this system gave them. A new waste-heat recovery system and generators now provide the enlarged mill with all of its power.

Unusual geology greatly simplifies the materials handling problem; belt conveyors are used to handle all materials into central storage silos. The conveyors in the quarry replaced a costly railroad system for hauling limestone to storage, while the central storage silos relegated a storage building with its costly overhead cranes to infrequent standby use.

The horizontal ledge of 30 ft. thick Ft. Scott Limestone is topped with about 15 ft. of shale and clay overburden. Taken together the stone and shale have just the right amounts of calcium, alumina, silica and iron to make excellent Type I cement without outside materials. Shale is simply stripped and hauled to a shale drying plant. Blasted limestone is hauled to a primary crusher in the middle of the quarry where it is picked up by the conveyor system and taken under a main highway to the cement mill.

Quarry efficiency has been improved with new drilling and loading equipment. A rotary drill puts down a 6-in. hole at about 1 fpm. Blasted rock is loaded out with a 4-cu. yd. electric shovel into one of a pair of new 25-ton end-dump trucks for the short haul to the primary crusher.



Features of plant include rock plant in quarry, upper right; shale plant, right center; raw material storage silos, center. Waste heat boilers are in building at near (feed) end of kilns, turbines in building just to right

Conveyors at rock plant on quarry floor lift rock to the top of the building for further screening or crushing

Monarch cement *continued . . .*

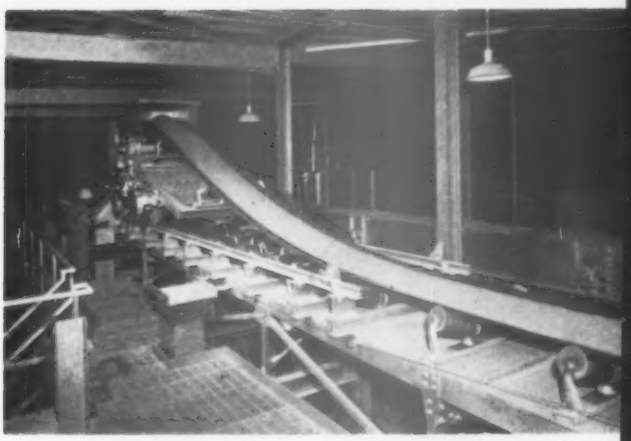
Shale usually has about 12 to 14 percent moisture when it is stripped. A pair of 15-ton end-dump trucks haul it to a shale-drying plant where it is crushed to minus ½ in. and dried to 1 percent moisture.

A heavy-duty manganese feeder under the truck dump hopper pulls the raw lump shale into a hammermill rated at about 150 tph. when reducing 6-in. material to minus ¾ in. Another heavy duty feeder of the same design under the crusher feeds the crushed material uniformly to a belt conveyor system for the trip to the feed end of a 10 x 80-ft. rotary dryer. This unit has a heat release of about 110 million Btu. per hr. and processes about 125 tph. when drying material with the maximum amount of initial moisture. Natural gas is used but oil is readily available as standby fuel.

The dryer is protected with both a flame failure system and a control failure system. A photoelectric cell in the firing hood "sees" the flicker of the flames, but no light or a steady light reaching the electric eye will open an electric circuit allowing magnetic valves in the fuel lines to close. Any failure in the instruments or controls will also close the fuel valves. After any automatic shutdown of the dryer it can be started only by manual operation of the controls.

Dried shale is screened on a 5 x 12-ft., double-deck horizontal vibrating screen. Material over the ¾-in. screen top deck is taken back to the primary hammermill on a drag conveyor to be recycled through the system. Oversize from the plus ½-in. lower deck is dropped directly into a secondary hammermill which has a nominal capacity of about 150 tph. Crushed shale drops to the inclined belt conveyor which picked up the through-screen fines. This is the first unit in the belt conveyor system taking the crushed, dried shales to the storage silos over the mills.

The shale-drying system is used to bring both gypsum and masonry rock into the cement plant. Gypsum is crushed and screened in the same



Belt tripper is used on distributing conveyor over raw silos. Advantage of silos over crane storage is labor-free withdrawal

equipment used for shale, but it is not necessary to dry it. The shale dryer acts only as a conveyor. This is an economical method of handling gypsum, since it is not used often enough to justify the expense of a separate materials handling system.

Masonry rock is brought to the shale processing system by tapping the flow of cement rock on its way from the quarry into the mill. This rock is dried and screened before it is sent to its own silo in the mill building over the shale belt conveyor system. This system permits either shale, gypsum or masonry rock to be diverted to the covered storage area when the mill silos are full.

Belt conveyors in the shale processing area are hooded at every discharage point to carry dust to a mechanical dust collector. The fines from the collector are discharged periodically to the belt conveyor leading to storage.

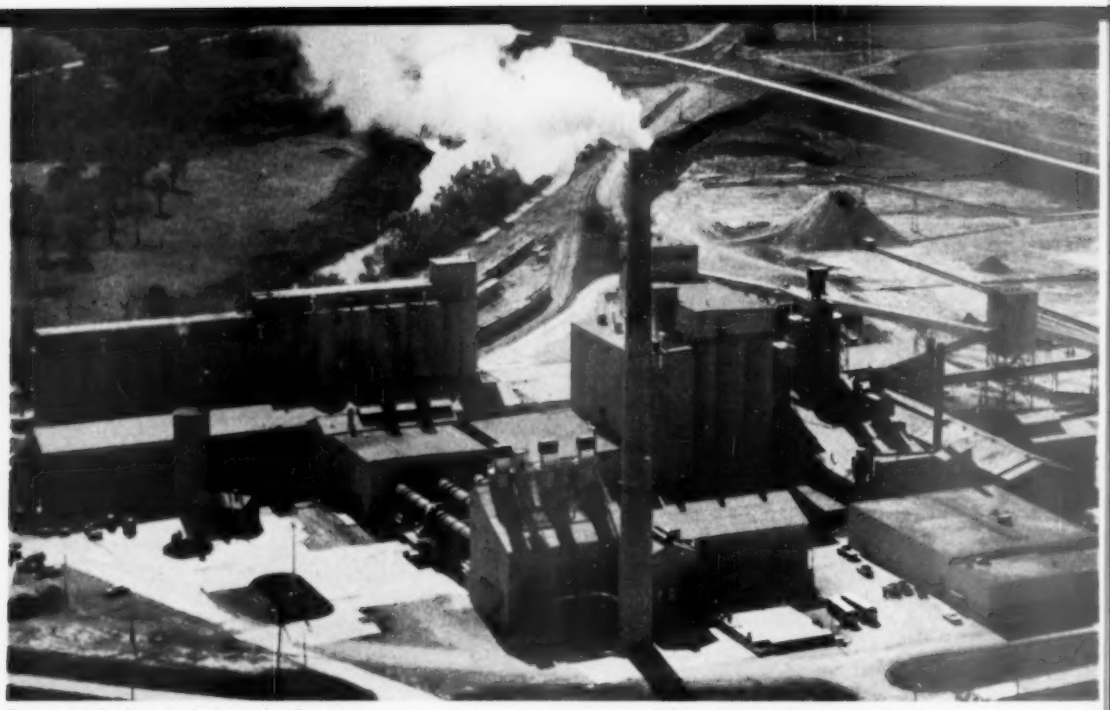
The stone preparation plant is in the quarry and was designed to handle about 450 tph. of quarry-run stone. A 42 x 65-in. gyratory crusher makes a minus 5-in. product and drops it to a short, heavy-duty apron feeder. This unit not only absorbs the impact of rock dropping from the crusher, but loads the inclined belt conveyor evenly and uniformly. This belt conveyor has a continuous weighing scale which records the tonnage of material coming out of the primary crusher. A metal detector loop stops the belt conveyor about 18 sec. after any metal disturbs the magnetic field in the loop. The operator then locates and removes the tramp metal.

A transfer tower with a truck loading chute give an opportunity to divert the flow of crushed, unsized rock to trucks. However, the rock usually continues to a surge bin over a secondary crusher. This bin is equipped with a vibrating feeder which gives a uniform feed up to about 450 tph. to an impactor. An impactor was selected for this application because of its ability to make a maximum of minus ¾-in. fines from the minus 5-in. limestone. The surge bin is large enough to hold all the material on the two belt conveyors ahead of it, if it should be necessary to stop them for any reason.

A high level control in the surge bin will shut down the primary crusher and its feeder whenever the bin gets too full. The safety interlocks later in the rock handling system will stop the crusher, feeder and belt conveyors in sequence ahead of the secondary crusher.

Crushed rock from the secondary crusher is taken to the top of a screening tower where a 6 x 14-ft., single-deck vibrating screen scalps off plus ¾-in. rock. Oversize and cement rock are dropped to storage bins, but only the overflow from each tank continues in the system. Cement rock drops to a belt conveyor which takes it out of the quarry to a 50,000-ton surge pile near the cement plant. Oversize from the top of the storage bin drops back into the secondary crusher to be recrushed and recycled in the system.

The rock stored in these bins is always available for use in Monarch's quarry roads. A vibrating feeder under each size puts it into the boot of a bucket elevator which lifts it to a 5 x 12-ft. double-deck vibrating screen. While this screen can make any size needed, it is normally fitted with a 1-in.-mesh top deck and an electrically heated, stainless steel, 8-mesh-cloth bottom deck.



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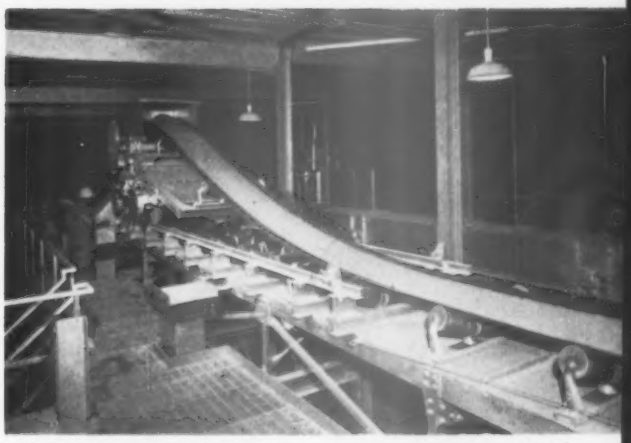

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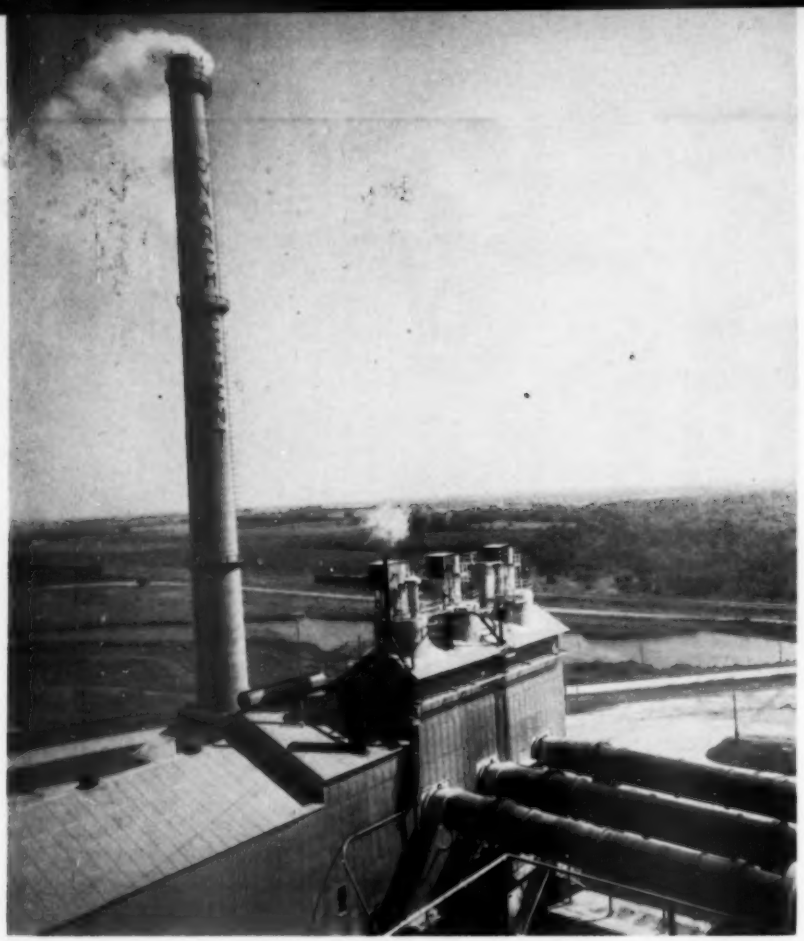
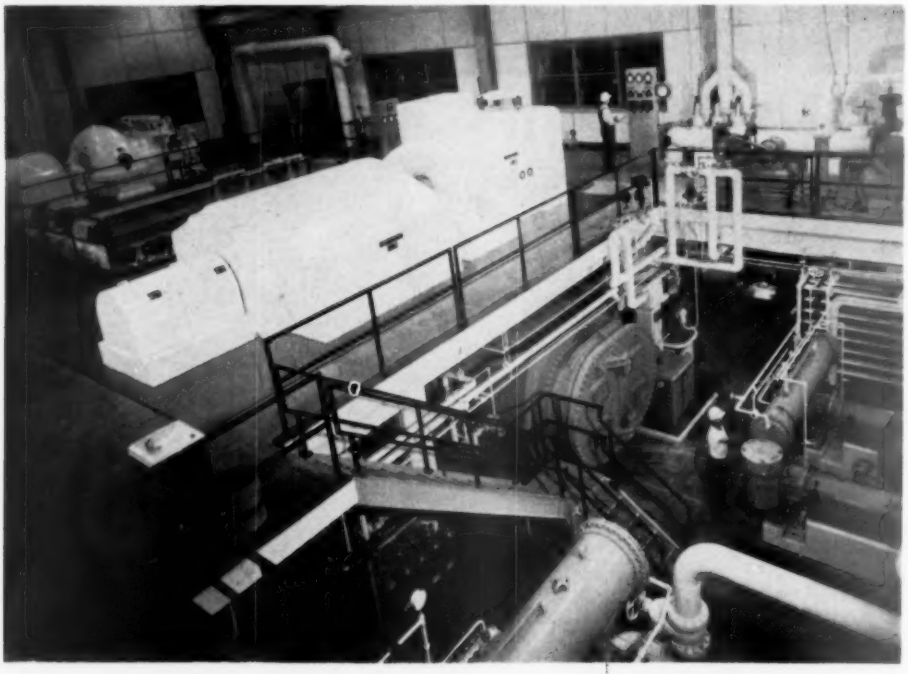


Kiln feed tanks stick out top of building. Electronic device automatically keeps tanks full

These steam turbines, together with waste heat boilers, provide enlarged plant with all its power



Monarch cement *continued...*

Oversize is usually chuted down to the surge bin to be recrushed, but it can be sent to the truck loading bin along with all the plus ¾-in. product. All fines through the lower deck are chuted to the cement rock belt conveyor.

The rock plant is equipped with water sprays to suppress dust; the eight sprinkler heads are individually controlled. The sprays over the belt conveyors are controlled by the material on the belt. When there is material on the belt, a wheel turns to keep a solenoid valve in the water line open. When there is no material on the belt the wheel cannot turn and the valve closes. The effectiveness of the water spray system is improved by using water which has been treated to reduce its surface tension, making it easier to "wet" the dust.

Cement rock is stored in the 75-ft.-high surge pile above three vibrating feeders. Ordinarily only two of these feeders are needed to put enough cement rock on the long belt conveyor to keep the mill supplied. The third feeder is controlled from the shale processing building and it is used exclusively to feed masonry rock from the surge pile to the shale handling system. The belt conveyor system from cement rock storage is housed in the same gallery as the belt conveyors taking shale to the top of the mill storage silos. At a transfer tower these conveyors are joined by a third belt conveyor system bringing clinker to mill storage. The three belt conveyor systems in the same gallery permit easy continuous inspection of the belts and idlers and access for lubrication or repair.

All materials used in the milling department are stored in 12 silos almost directly above the mills. About 8,000 tons of cement rock is held in 4 silos and interstices, and about 4,000 tons of shale in 2 silos and 2 interstices. This is enough material to keep the 2 raw grind mills working continuously more than 4 days. About 8,500 tons of clinker in 6 silos and 890 tons of gypsum in 1 interstice are ample to keep the 2 finish mills working continuously for about 5 days.

Raw materials are put into storage by a conveyor system which distributes each material to its proper place. A traveling tripper on a belt conveyor distributes cement rock to the silos, but drag chain conveyors handle shale, masonry rock, gypsum and clinker.

The milling department draws material out of the 12 silos with automatically-controlled weighing belt feeders. Only the gypsum bin has two feeders, one to feed each finish mill.

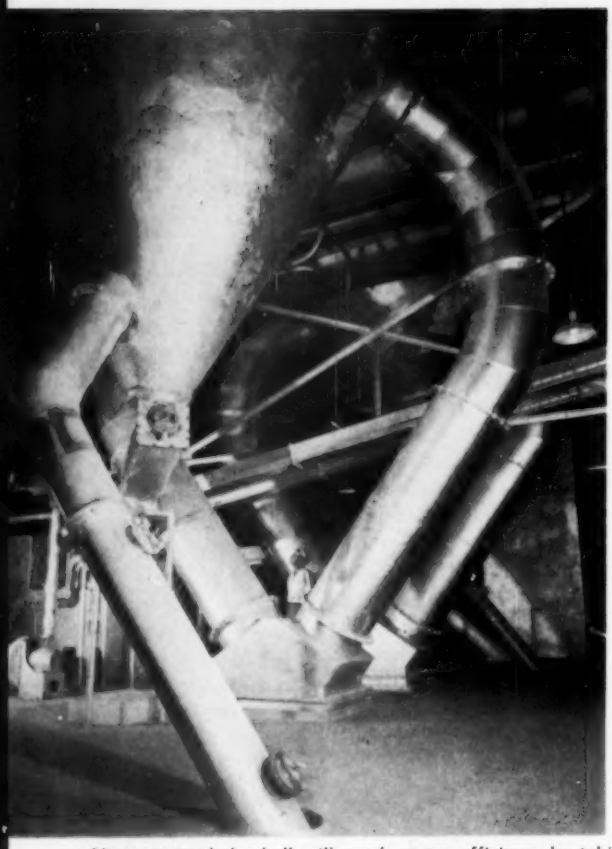
Each of the automatic feeders is controlled by the miller of either raw grind or the finish grind mills. The belt feeders not only regulate the amount of feed to each mill, but keep a continuous record. Raw rock and shale are fed to each mill at a ratio of about 2:1, at a maximum rate of about 60 tph. The actual proportion of each ingredient is set by the plant chemist, but it is the responsibility of the miller to maintain production through the mills.

Two raw-grind ball mills are each 10½ x 15-ft., single-compartment units operated with an 800-hp. synchronous motor. Raw materials drawn from storage are elevated to a heated air separator which takes out all minus 200-mesh fines and drops the oversize to a mill. Ground materials are conveyed back to the foot of the elevator to be recycled through the separator. Actual production is mostly finer than 200 mesh; more than 80 percent of the kiln feed material will pass 325 mesh. Fines from the air separator are pumped to one of 10 concrete storage silos along with all dust collected from the raw grind area.

Finish mills are a pair of 10 x 28-ft., two-compartment ball mills driven with 1,250 hp. synchronous motors. Type I cement can be produced at the rate of about 200 bbl. an hour at 1,750 Wagner fineness. Clinker and gypsum are drawn from storage with weighing belt feeders and dropped to an inclined belt conveyor which discharges directly into a mill. Dry, granular admixes are metered to this conveyor. Cement from the mills is elevated to an air separator, which drops oversize directly into the mill. Finished cement is chuted to a cement cooler which can reduce the temperature of about 200 bbl. an hour from a maximum 190 deg. F. to less than 150 deg. F. Cooled cement is pumped to storage silos, and is ready for bulk shipment or bagging.

Clinker is made in three 11 x 230-ft. kilns driven by 75-hp. motors at about 1.5 rev. per hr. Each kiln has an individual storage tank for kiln feed of sufficient size for six hours operation. The raw kiln feed is pumped from the ten raw storage silos to the three tanks. The pump system is controlled by an electronic device which senses the level in each tank and, through automatic diverting valves, directs the feed to the lowest of the three. After 15 min., or when a tank is full, the valves automatically reposition to the next bin which requires material. This process is then repeated for each tank until all are full, at which time the pump is automatically shut down. The system will then periodically "ask" each bin for material-level status and, when required, automatically restart the pump with the flow directed to the proper bin.

The kiln feed is withdrawn from the tanks through a vane feeder which discharges into a constant level 1-cu. yd. surge bin. A roll feeder



Air separator helps ball mills work at top efficiency by taking minus 200-mesh fines from mill feed

Monarch cement *continued . . .*

then delivers the material directly to the kiln through a water-cooled feed pipe. Power for the roll feeder is furnished through a synchronous tie generator system which electrically adjusts the feeder speed in direct proportion to the speed of the kiln.

Clinker from each kiln is discharged to a reciprocating grate cooler which reduces it to about 175 deg. F., and the cooled clinker is dropped to a 38 in. x 100-ft. reciprocating trough conveyor. A drag chain conveyor system transports the clinker about 170 ft. to a 5 x 8-ft. rod deck vibrating screen which scalps off plus ½-in. clinker. Through-screen clinker falls to the first unit in the belt conveyor system to take it to a mill storage silo while oversize is chuted to a double roll crusher. Crushed clinker then drops to the belt conveyor to be taken to storage with the fines.

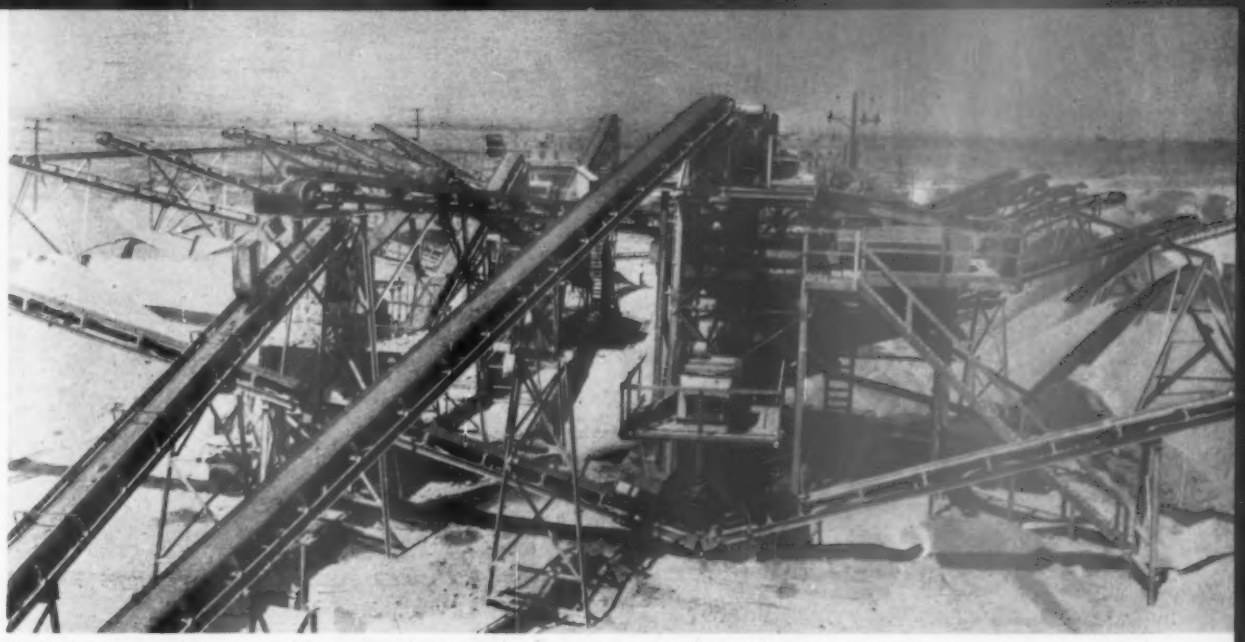
Exhaust gases of 1,400 deg. from the kilns are used to make steam. At normal operation each kiln's waste heat boiler generates about 35,000 lb. of steam an hour at 450 psi. and 700 deg. F. The steam drives a 7,375 kva. generator which produces power to operate all departments of the mill.

To insure continuous operation, there is a 40,000 lb. per hr. direct-fired boiler equipped with gas and standby oil burners, while the generator room has an auxiliary 5,000 kva. generator for standby use.

As a result of this rehabilitation and expansion program, the Monarch Cement Co. can boast of one of the most modern and versatile cement manufacturing plants in the U. S. The fact that Monarch was able to make the changeover without loss of production is a tribute to the skill, ingenuity and enterprise of its management. END

MAJOR EQUIPMENT USED BY MONARCH CEMENT CO.

In quarry:	
Shovels (3)	Harnischfeger Corp. (1) 4 cu. yd. Marion Power Shovel Co. (2) 2 cu. yd.
Dragline	Harnischfeger Corp.
Trucks, 15 ton (2)	Euclid Div., GMC
Trucks, 25 ton (2)	Dart Truck Co.
Rotary drill	Joy Mfg. Co.
Crusher, 42-65 gyratory	Allis-Chalmers Mfg. Co.
Vibrating screen, 5 x 12	Hewitt-Robins, Inc.
Belt conveyor idlers	Hewitt-Robins, Inc.
Vibrating screen, 6 x 14	Allis-Chalmers Mfg. Co.
Secondary crusher	Pennsylvania Crusher Div., Bath Iron Works
Apron feeder	Pioneer Engineering, Div. of Poor & Co.
Bucket elevator, 12 x 7 c.d.	Chain Belt Co.
Vibrating feeders (6)	Jeffrey Mfg. Co.
In shale plant:	
Apron feeders 5 x 28	Pioneer Engineering, Div. of Poor & Co.
Apron feeder 3 x 10	Pioneer Engineering, Div. of Poor & Co.
Primary crusher 40 x 40-in.	Hammermills, Inc.
Secondary crusher 18 x 35-in.	Hammermills, Inc.
Shale dryer, 10 x 80	Allis-Chalmers Mfg. Co.
Vibrating screen, 5 x 12	Allis-Chalmers Mfg. Co.
Drag chain conveyor 18 in. w.	McNally Pittsburg Mfg. Corp.
Belt conveyor idlers	Hewitt-Robins, Inc.
In cement plant:	
—Raw materials:	
Drag chain conveyors 16 in. w. (2)	McNally Pittsburg Mfg. Corp.
Weighing feeders (10)	Merrick Scale Mfg. Co.
Bucket elevators (2) 27 in. x 11 in. c.d.	Chain Belt Co.
Air separators (2)	Sturtevant Mill Co.
Air heaters (2)	Fabricating Engineering Co. Inc.
Ball mills, 10 x 15-ft., and Symetro drives (2)	F. L. Smidth & Co.
Dust collectors (4)	Northern Blower Co.
Ball mill motors, 800 hp. (2)	Electric Machinery Mfg. Co.
Pneumatic conveyors	Fuller Co.
Automatic kiln feed control "cypak"	Westinghouse Electric Mfg. Co.
—Clinker:	
Drag chain conveyors 16 in. w. (5)	McNally Pittsburg Mfg. Corp.
Weighing feeders (8)	Merrick Scale Mfg. Co.
Bucket elevators (2) 27 in. x 11 in. c.d.	Chain Belt Co.
Air separators (2)	Sturtevant Mill Co.
Cement coolers (2)	F. L. Smidth & Co.
Ball mills, 10 x 28 ft., and Symetro drives	F. L. Smidth & Co.
Ball mill motors, 1,250 hp.	Electric Machinery Mfg. Co.
Dust collectors (4)	Northern Blower Co.
Pneumatic conveyors	Fuller Co.
—Kiln and power department:	
Kilns (3), 11 x 230	Allis-Chalmers Mfg. Co.
Clinker coolers (3)	Allis-Chalmers Mfg. Co.
Reciprocating trough conveyor 38 in. x 100 ft.	F. L. Smidth & Co.
Clinker breakers (3)	Monarch Cement Co.
Clinker crusher	Rogers Iron Works
Vibrating screen 5 x 8 ft.	Nordberg Mfg. Co.
Turbine, 9,375 kva.	Westinghouse Electric Corp.
Turbine, 5,000 kva.	General Electric Co.
Waste heat boilers (3)	Babcock & Wilcox Co.
Power plant design	Black & Veatch
Cement plant design & general contractor	MacDonald Engineering Co.



Crushed rock is made from plus 2½-in. feed by jaw and cone crushers, screened and piled in six sizes in row at left. Sand and gravel is washed and screened in large tower, foreground, and in another behind it, and stored in piles at right

Rinker Rock's two-in-one plant makes crushed stone, sand, gravel

TWO PLANTS IN ONE: that's Rinker Rock Company's new sand and gravel plant near Bakersfield, Calif. Divided into two parallel production units, wet and dry, the plant produces 300 tph. of crushed stone and washed sand and gravel.

The plant's main elements are in four screening towers—two for the washed sand and gravel and two for the crushed rock. In each tower is a three-deck vibrating screen. One of the four screens is 4 x 14 ft. and three are 4 x 12-ft. units. Water for washing sand and gravel is supplied by a 75-hp. deep-well pump plus a 50-hp. booster pump delivering 1,200 gpm. to the plant.

About 60 percent of the plant's output is gravel and crushed rock; the remainder is sand. Concrete and masons sand are produced alternately. The pit-run is relatively clean and no special problem is involved in getting clean sand, gravel and crushed rock.

Belt in foreground and a second like it are reclaim units running in tunnels under piles of finished aggregate. They either load trucks directly, or supply ready-mix plant at rear

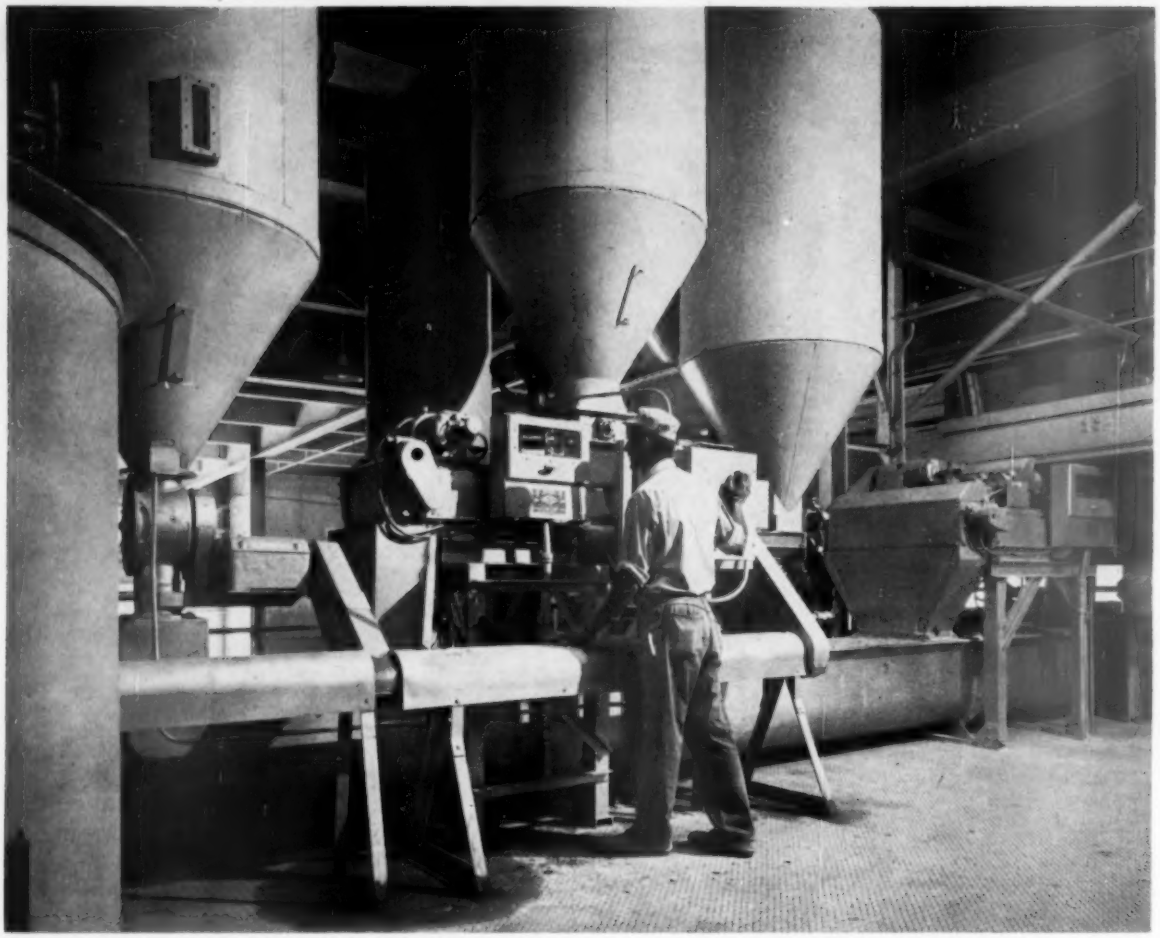
The flow to both sides starts in the pit, where a 2-cu. yd. dragline strips 4 to 7 ft. of overburden from a bank of gravel 20-40 ft. high. The same dragline loads two 12-cu. yd. rear-dump diesel trucks which unload at a hopper above a vibrating feeder-grizzly with 2½-in. openings.

Plus material from the grizzly is fed to an 18 x 36-in. primary jaw crusher, then is belt-conveyed to a 4¼-ft. cone crusher with a fine bowl. The crusher operates in closed circuit.

The crusher product is conveyed to the first screening tower on the dry side, where two sizes of crushed rock—¼ in. and dust—are removed on a 4 x 12-ft. dry screen and belt-conveyed to stockpiles.

Processing equipment in this neatly designed plant is bracketed by two parallel stockpile systems. One row is for storage of sand and the

Please turn to page 141



Volumetric and weighing feeders control precisely the flow of each raw material to large mixing screw conveyor beneath

Close raw material control pays at

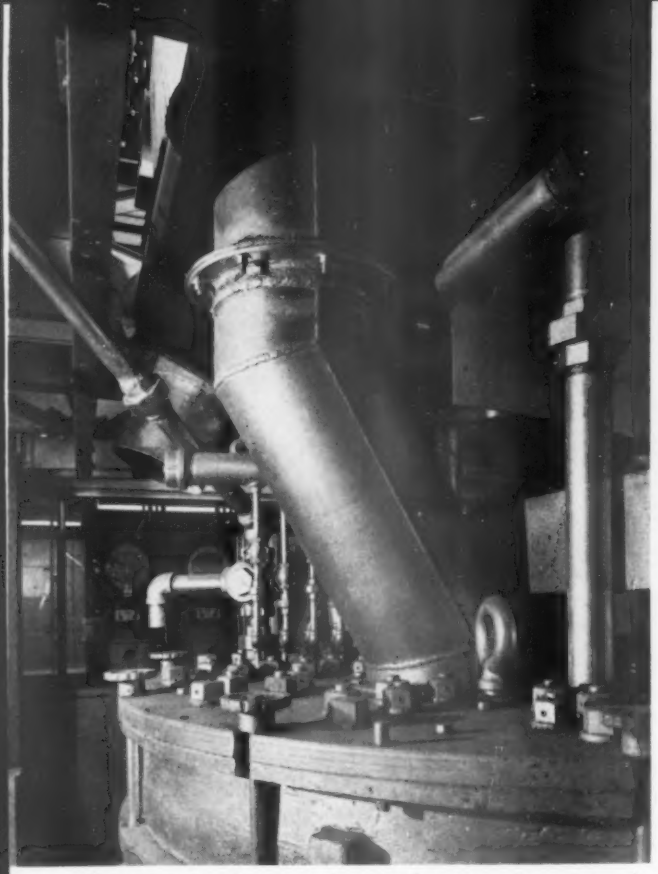
Savings in raw material, higher quality product are result of continuous proportioning devices used at Kaiser plant

KAISER GYPSUM'S NEW GYPSUM PRODUCTS PLANT at Antioch, Calif., is one of the most precisely controlled operations of its kind. A complex raw-material control system, incorporating electronically and mechanically regulated continuous proportioning devices, pays off in these big advantages: manufacture of a product of consistently high quality, greater control during the drying process because of this consistent quality and savings in raw material.

In the past, excess raw material was used to insure that minimum amounts of necessary ingredients would be present in the finished product. Now, with continuous control, the plant is able to operate very close to predetermined specifications.

Here's how the system works: Stucco, flour and raw gypsum are fed to a large screw conveyor by three weighing feeders; lime and popper perlite reach the screw by means of mechanically regulated volumetric feeders. The screw conveyor mixes the products of both types of feeders and delivers the material through another feed screw to a pin mixer at the point where the wallboard is made. Paper pulp and the necessary water are

*General Conveyor, Inc., of Northern California



Dry raw materials are combined with paper pulp, water and soap solution in the pin mixer in foreground. Control panels and recording devices are in room at rear

*by Harold Ziegler**

gypsum plant

pumped directly to the pin mixer. Soap solution, fed through two rotodip feeders, is also delivered directly to the pin mixer.

The control panels and recording devices for all this equipment are located in a Master Control Room on the floor below the raw material line.

The three weighing feeders controlling the flow of gypsum, flour and stucco are continuously fed and are regulated electronically. These units can be set to operate at a predetermined fixed rate, or they can be made to follow a master variable signal. The feeders are basically belt conveyors that are constantly weighed by a scale system. An independent electronic control system in each feeder controls the output rate of the weigh-belt. The speed of the belt is varied through motors with tachometer generators showing their speed.

An alarm system is incorporated into the balancing control circuit of the feeder. If a feed bin is empty or if the material bridges in the hopper, the weighing feeder will run out of balance. If this does not correct itself in 15 sec., the alarm will sound; if the situation is not remedied within another 15 sec., the entire system stops. To allow the operation to continue when the problem can be solved readily, the operator can delay shutdown for another 30 sec. by throwing a relay.

The mixing screw into which the weighing feeders deliver their products is driven by a 25-hp. dc. motor. A motor generator set for supplying this direct current is located in the control room. A tachometer generator enables an electronic control to operate the mixing conveyor as a slave.

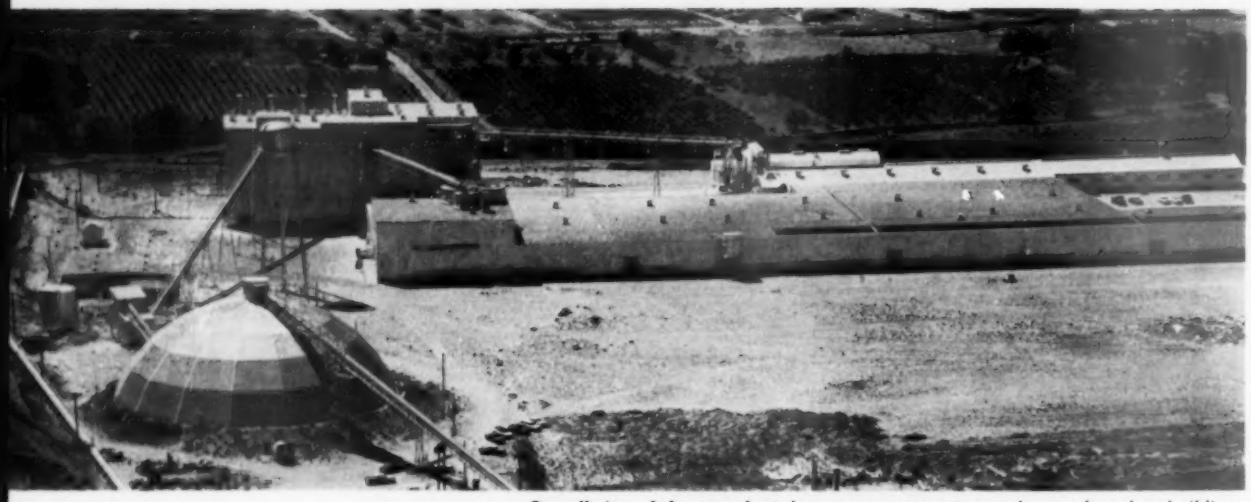
A countershaft runs the full length of and is chain driven from the mixing screw. This countershaft drives the two rotodip feeders supplying the soap solution, a variable-speed drive which controls the rate of flow of the popped perlite through a rotary vane feeder, and a feeder controlling the flow of lime. Any variation in the speed of the mixing conveyor causes a proportional change in the various mechanical units attached to the countershaft.

Since each unit is operated by a manually controlled variable-speed unit, the feed rates of the mechanically driven volumetric feeders operating from the countershaft can be further adjusted. The lime feeder has an adjustable throw ratchet and the rotary vane feeder is driven through a variable-speed drive. The rotodip feeders can be further adjusted through a cam-and-clutch type transmission.

The pulp pump is driven by a 7½-hp. dc. motor whose motor generator set is located in the control room. A tachometer generator indicates the speed of the pump and provides the control link for this item in the system. Should there be a failure in the pulp pressure, the system will go through the same warning cycle described for the weighing feeders, and it will finally shut down. Should the system plug, a pressure switch immediately shuts down the operation to protect the pump from high pressure.

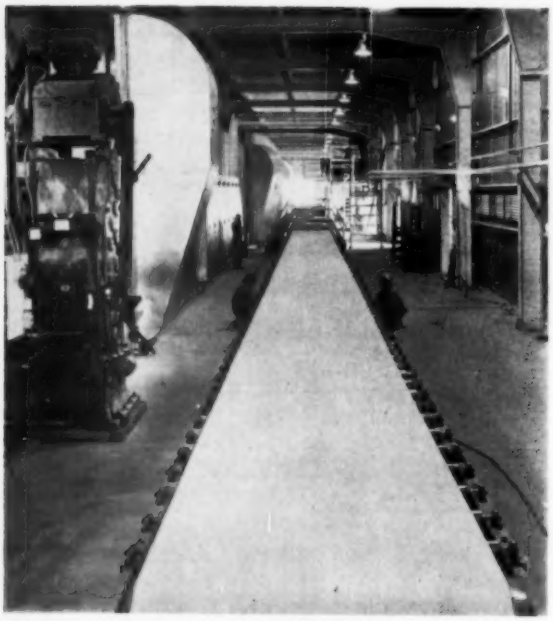
The pump providing water is driven by a 15-hp., 3,000-rpm. motor. The water system is controlled by a throttle valve. A water meter placed in the line drives a tachometer generator through a coupling. As noted in other phases of the system, the tachometer generator is the link for controlling these units. To avoid plugging of the pin mixer due to insufficient water, the system will stop immediately if the pressure fails.

The mechanism that allows very close control and instantaneous response is an electronic control. It is a master-slave arrangement, with the master signal set manually at the master control



Overall view of the new plant shows raw gypsum storage dome, other plant buildings

Gypsum control *continued . . .*



View of finished board line shows dryer at left

panel or supplied automatically by a tachometer generator located on the head pulley of the wallboard machine. At the master control panel, the master signal voltage is compared with the voltages established by the other tachometers in the system. Proportional variations between these voltages will cause the components to deliver more or less of the material they control. The various proportions and quantities of raw material determined by the plant chemist are established for each element in the system through the ratio-setter box.

With the selector switch on "automatic," any variance in the speed of the wallboard machine will be reflected in proportional changes of feed of the raw materials supplied to the pin mixer by a variation in the speed of a pump or conveyor weigh-belt or, in the case of water, by the opening of a throttle valve.

With the selector switch on "fixed," the operation is much the same, except that the variable control voltage supplied from the master tachometer generator is replaced by a fixed reference voltage at the control panel. The slaves are controlled automatically in the desired ratios to this fixed signal. A control knob on the master panel permits the operator to vary manually the fixed control voltage with an immediate and corresponding proportional change in the setting of the slave units.

There are seven control panels: Panels 1, 2 and 3 house the controls for the weighing feeders, have ratio-setter boxes, remote totalizers and feed rate dial indicators with 24-hr. chart recorders. Panel 4 is the master control panel. The various group control mechanisms, "fixed" or "tach" control and wallboard-machine speed recorder are mounted on this panel. Panel 5 has a ratio-setter box and a dial indicator with a 24-hr. chart recorder showing the total pounds delivered by the admix screw. The sixth panel indicator and recorder with remote totalizer indicates conditions in the pulp system. Indicators and recorders for water and soap are mounted on the seventh panel.

The plant's raw material control system was engineered and supplied by General Conveyor, Inc., of Northern California, with Kaiser Engineers as the overall engineer-contractor.

END

Drilling hard limestone for only 4½c per ton

Nally & Gibson Quarry finds an efficient worker in its compressed-air rotary drill

A TEST OF COMPRESSED AIR DRILLING in hard limestone set an economy record recently at the Nally & Gibson Quarry, Greensburg, Ky. Thirteen blast holes—a total footage of 830 ft.—were drilled in four days at a cost of 4½ cents per ton of rock removed. A rotary drill mounted on a self-propelled compressor was used.

Previously a wagon drill and separate air compressor were used. Several men were needed to operate and move the two units, so the firm was receptive to the idea of a one-man, one-piece unit.

Bit cost plus straight-time labor, overtime, depreciation, gasoline and oil totaled $392.85. Divided by 830 ft., this yields a cost per foot of 47 cents. Drilling cost per ton of rock removed was 4.4 cents for nine of the holes and 4.7 cents for the other four.

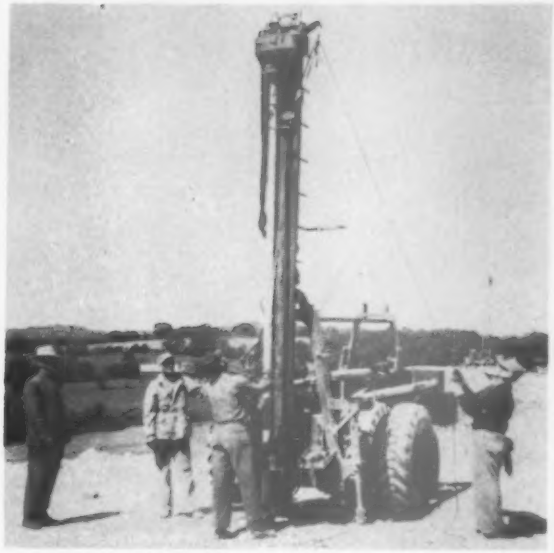
The rig used is set up by raising the mast, leveling the rig and attaching the bit. The drill can be moved from hole to hole around the quarry without the mast being lowered.

Increased penetration rates of 55-66 percent have been reported by quarrymen using air drills in hard limestone areas. Chips are cleaned out of the hole as they are formed, which reportedly extends bit life 35 to 300 percent.

One-man operation also contributes to the operational economy. All drilling controls are mounted in a single bank, with pressure regulator and hydraulic downfeed control gauge. Downfeed is automatically controlled.

The drill used in these tests is designed to drill 4¼-in. diam. holes for the new, larger sizes of packaged powder, as well as for larger concentrations of loose powder. Down pressure can range up to 10,000 lb., and depths to 500 ft. can be reached with the 2⅞-in. drill pipe used in this service.

The rig used was a Schramm Rotadrill mounted on a heavy Pneumatractor. END



The compressed-air unit used is moved by truck, has lowering mast. Down-pressure can range up to 10,000 lb.

One-man operation was important factor in the low cost achieved in hard limestone. All controls are grouped

Sinter cake, red-hot inside, slides off traveling grate

From coal mine waste to light aggregate

By LEO WALTER

A BRITISH FIRM, The Butterley Co., Ltd., looking for an economical method of processing colliery waste shale into expanded aggregate, decided to investigate the sinter-hearth technique invented by Frank Leftwich and used successfully for years in the United States. That decision, followed by thorough testing of the method, has culminated in the opening in Salterwood, near Derby, of the country's first Aglite plant, capable of turning out 40 cu. yd. of aggregate per hour.

Operating on a license granted by Mr. Leftwich's British licensees, Messrs. Aglite (Great Britain) Ltd., the plant is the first endless-grate continuous sintering plant for aggregates in the British Isles. It is considered remarkable that an American process has been extremely successful under somewhat difficult conditions in Great Britain, although the sinter-hearth process has been used there and in other parts of the world for the reduction of iron ores.

A long program of tests and experiments has pointed to consistent uniformity of results and the company feels that these results have close parity with those for the best expanded shale aggregate available in the United States. Since its product compares so favorably in many respects, the firm is confident that it will make as good a showing in areas where tests have not been concluded, for instance, in thermal conductivity and sound absorption coefficients.

Aglite is available in three grades from the plant: coarse, medium and fine. The coarse material—¾ to ½ in.—has a typical bulk density of 31 lb./cu. ft. (2.7 cu. yd. per ton). Comparative figures for the ½ to 3/16-in. medium grade, and the 3/16-in. to dust fine grade are 35 lb./cu. ft. (2.3 cu. yd. per ton) and 50 lb./cu. ft. (1.7 cu. yd. per ton) respectively. Test analyses have shown a 3.15 percent loss on ignition and .165 of 1 percent soluble sulfates.

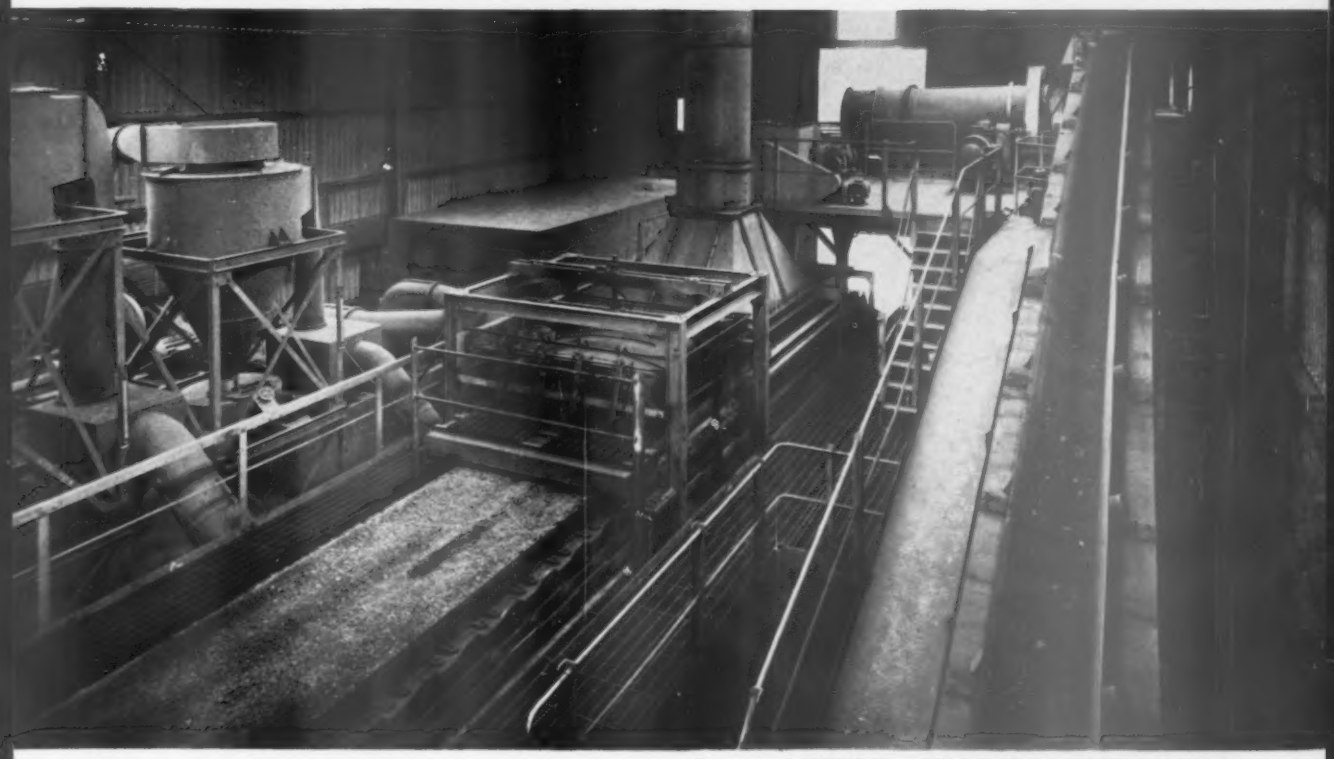
Typical chemical analysis breaks the aggregate down into the following components and their percentage by weight:

Silica (SiO_2)	56.03
Aluminum oxide (Al_2O_3)	31.00
Iron oxide (Fe_2O_3)	5.15
Calcium oxide (CaO)	3.10
Magnesium oxide (MgO_2)	0.31
Total sulfate (SO_3)	1.70
Titanium oxide (TiO_2)	0.60
Loss on ignition	1.42
Alkalis and undetermined	0.69
	100.00 percent

The price of all three grades, loaded into vehicles at the plant, is $2.80 per cu. yd.

The best description of the plant's operation was contained in a paper given before the British Ceramic Society by Frank Catchpole, managing director of Butterley's Aglite division. His report on the Butterley process for sintering carbonaceous shale was published in the society's Transactions for October, 1957, and accounts for much of what follows.

The Derby plant takes its raw material from a



Raw material is fed from pelletizer drums to feed end of grate, rear. Fans, left, draw air down through bed, and aid sintering of shale, burning of coal

nearby coal mine waste pile. An analysis of the material has determined that it contains 43.06 percent of silica; .39 of 1 percent of calcium oxide; 3.51 percent of iron; 11.35 percent of volatile combustibles and 11.55 percent of fixed carbon.

This shale has a high total loss on ignition. Its fixed carbon content is more than high enough to permit sintering and could cause excessive fusion. The optimum ignition loss is probably eight or nine percent, but a wide latitude exists.

The content of volatiles, at 11.35 percent, also is high. During the process they tend to be driven off ahead of the main fire zone, and they include gases which fail to ignite and are exhausted to atmosphere as smoke.

The heart of the plant is the sintering machine —a traveling grate on 85 ft. 6 in. centers and 5 ft. 3 in. wide, with side plates that permit it to be charged to a depth of 6 to 14 in. Fuel is either contained in or added to the clay, so that once the charge has been ignited at one end of the machine, no additional fuel or outside source of heat is required. Combustion of the carbon is encouraged by a strong vertically downward draft through the bed, which raises the temperature of the bed rapidly to between 2,000 and 2,200 deg. F. This results in partial fusion and bloating of the clay, and by the time the material has traveled the length of the machine, combustion is complete. The rate of travel is variable between 4 and 12 fpm.

On the sinter grate, the material must form a permeable bed to enable air to pass through. To do so, raw material is first ground to dust, water is added, and the moist dust is pelletized. Any type of dry grinder could be used, but the high rate of output at the Derby plant and the high electrical costs in England dictated choice of a unit that could handle 30 tons of raw material per hour as cheaply as possible. It is a rim-discharge pan that reduces shale to ¼ in. to dust at that rate. This comparatively coarse grinding, the company feels, is adequate because carbon is in the material. If carbon were to be added, finer grinding would be desirable to permit fuel and clay to be mixed intimately.

From the grinding machine the ground raw material is conveyed to a 25-cu. yd. surge hopper, so that it can be discharged at a controlled rate by means of an electro-vibrating feeder. A second conveyor then takes it to the pelletizers—twin rotating drums 4 ft. diam. x 12 ft. long, inclined at a slight angle. Clay dust enters at the rear end of the drums and while it is tumbled through them, water sprays increase its moisture content by 14 or 15 percent. A screw conveyor spins in the lower

Overall view shows bunkers for three sizes of Aglite

Coal mine waste *continued . . .*

part of the drum as it revolves, helping to move the material forward and to eject it onto a collecting belt. When it leaves the pelletizer, the ground material has been formed into moist and crumbly pellets ranging in size from 1 in. down.

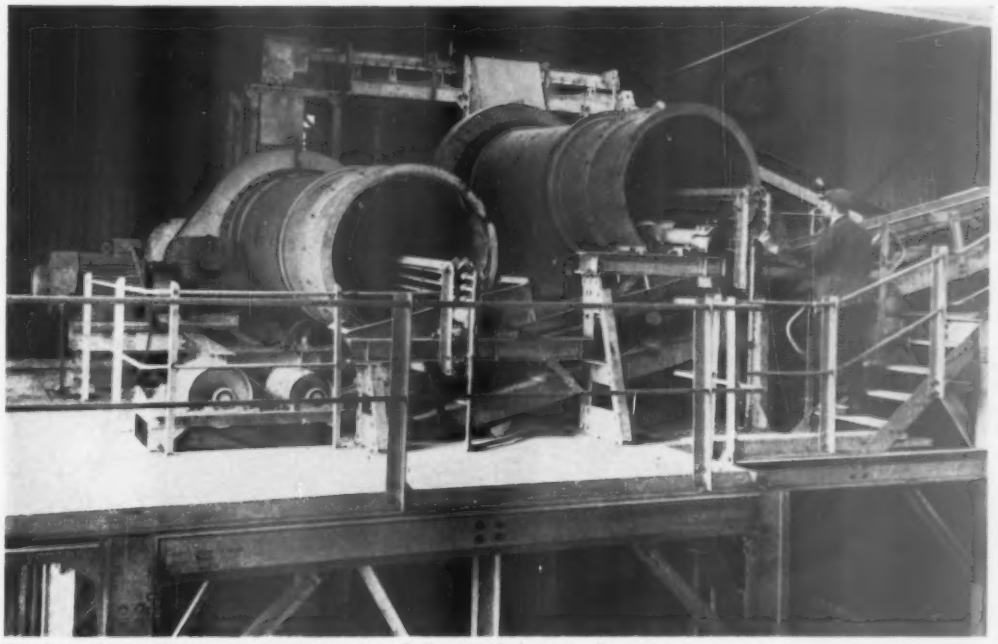
The pellets are charged across the width of the grate with a swinging spout which eliminates the tendency for larger pellets to run to the edge. A serrated gauge bar levels and strikes off the charge as it is carried forward, the serrations causing as much surface as possible to be exposed when the charge passes under the ignition hood.

Between the charging spout and the ignition hood is a drying section in which some of the free moisture is removed and blown to atmosphere by means of residual heat transferred from the far end of the machine. This pre-drying is done to reduce the volume of steam fed to the stack. This stack gas, because it is drier, can be burned to cut smoke air pollution.

The ignition hood is a chamber built of refractory concrete sections spanning the bed for a length of 6 ft. Six oil burners maintain a temperature of about 2,000 deg. F. inside the hood to ignite the surface of material passing through. Combustion starts immediately, and soon only the exposed clay glows red hot. The process is very much like lighting a pipe of tobacco with the flame of a match.

A downward draft supplies air for combustion of the carbon as the clay travels along the length of the grate, causing it to fuse and bloat. The draft is created by six fans ranged along the bed, each exhausting its own windbox located directly below the hearth. The negative pressure in the windbox draws air from atmosphere down through the bed. At the ignition end the resistance of the bed of material is comparatively low, about 3 in. hg., but it increases along the grate until the final fans pull against about 15 in. hg.

The temperatures of the gases escaping from the windboxes are surprisingly low until one considers the process. The high draft employed to



Revolving drum pelletizers and collecting belt. Pellets are fed to traveling grate

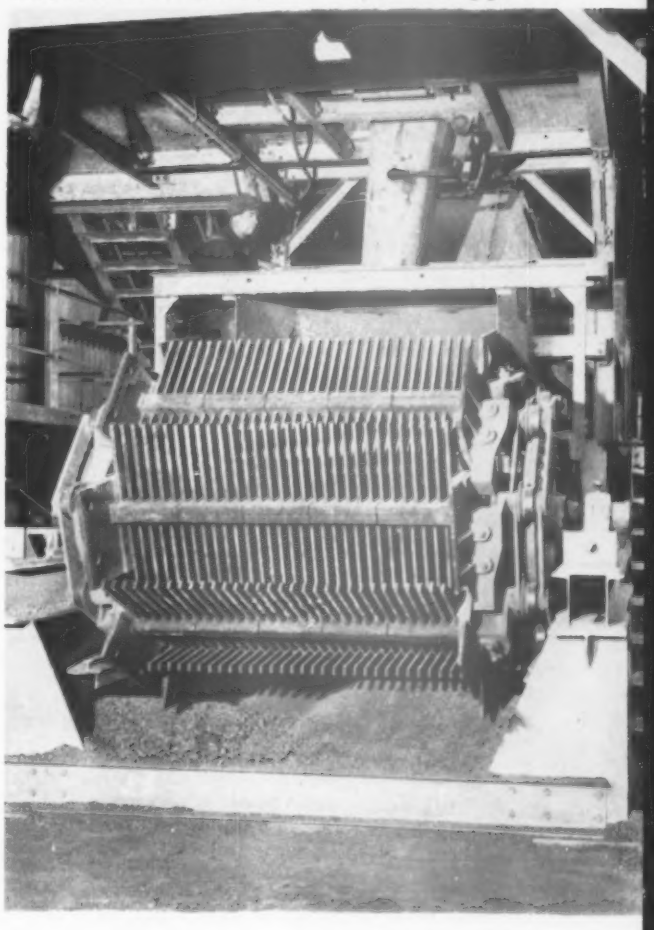
achieve rapid combustion causes a considerable excess of air to pass through the bed and to be exhausted with the products of combustion. Typical temperatures noted on the six windboxes are, in order from 1 to 6: 161, 239, 248, 313, 253 and 212 deg. F. Gases passing through the first and second windboxes are moist, causing so much condensation within the boxes and ducting that regular drainage is necessary.

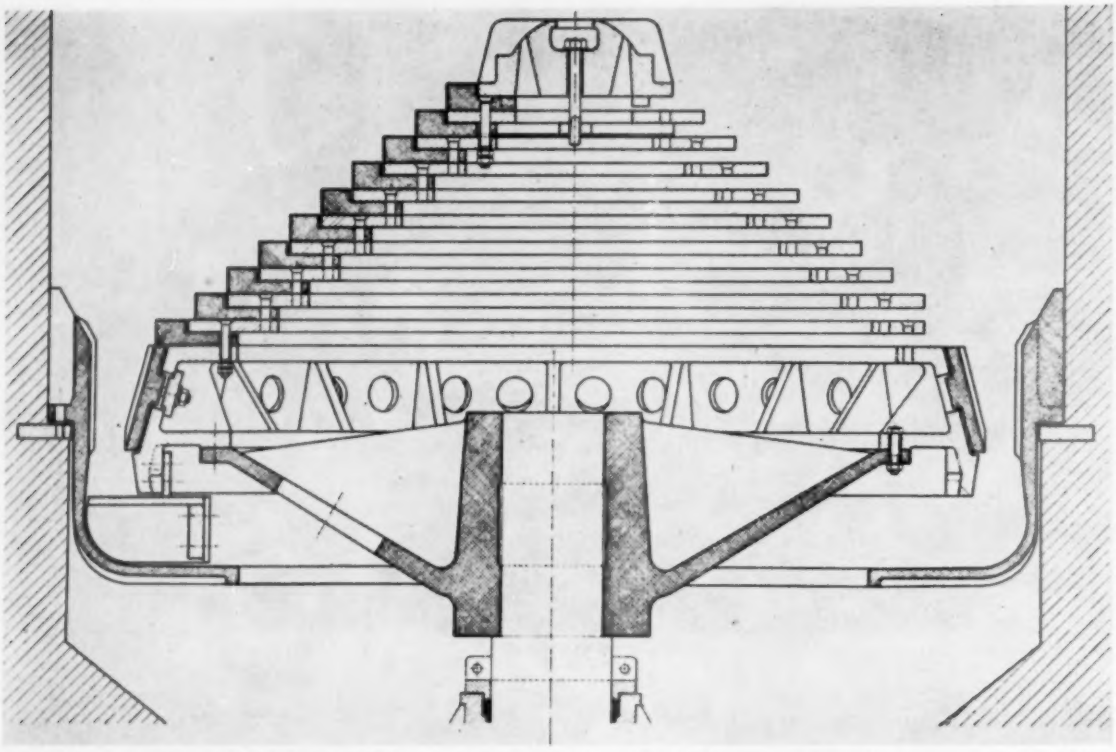
An idea of the volume of gases handled can be gained from the fan-motor hp. ratings: No. 1, the ignition hood fan, has a 15-hp. rating; No. 2 has 40 hp.; and 3, 4, 5, and 6 have 50-hp. fans each. An additional 100-hp. fan is used in transferring exhaust gases from the discharge end of the belt to the drying section and in blowing them through the bed.

Final processing. It takes the pelletized material about 10 minutes to travel the length of the machine to complete the sintering process. The sinter cake is discharged over the end, falling onto a large screen and then into a concrete pit, breaking off in large slabs. The screen lets dust and unsintered material fall through into a chamber from which it is picked up by elevator and returned to the grinding pan. On reaching the pit the cake is cool only on the outside; the center is red hot and pyroplastic. It is removed by a clamshell from the pit and stockpiled to cool. After annealing overnight, it is elevated to be crushed by primary and secondary roll crushers.

Please turn to page 143

Swinging spout, top, spreads pellets evenly over moving grate





Stepped grate at bottom of shaft kiln doesn't break up compact clinker, thus eliminates uneven burning, uneven cement quality

New grate boosts quality of shaft kiln cement

Lower costs, higher quality result from kiln using grate, conical section, powdered coal

*by Eberhard Spohn and Eduard Woermann**

THE HIGHEST STANDARDS OF CEMENT-CLINKER quality can now be met by shaft kilns with a new stepped grate that can make loose, friable clinker that is well burnt and well cooled. With this basic advance in shaft-kiln design, producers can find these big advantages in remodeling older installations:

- Fuel economy.
- Automatic kiln feed, which enables one operator to handle several kilns.
- Automatic control of flue-gas temperature, permitting the use of electric precipitators.

**Eberhard Spohn introduced the conical sintering zone for cement shaft kilns and the lime deviation method of raw mix control. After working on German, and later American rocket projects, he became a member of the board of directors of Portland-Zementwerke Heidelberg, A. G., in 1951. Dr. Eduard Woermann began work for the firm in 1951. He has studied the disintegration of C_2S in shaft kilns and sinter grates.*

In areas where production units up to 200 tpd. (1,200 bbl.) are required, the shaft kiln is once again a very economical solution.

We have now learned how to obtain a short fire and a porous clinker, but this cannot be done with a grate of conventional design. Conventional grates break up the compact clinker and the broken pieces immediately fall through the grate. If all the material is loose it will "flood" through the grate without any control. "Rat holes" and craters will develop at the surface and the fire will be torn up. So with conventional grates, the operator must produce compact clinker for steady operation. This densely burnt and slowly cooled clinker is the cause of the inferior quality of older shaft kilns.

The key to better quality is the new grate, which prevents flooding entirely. This grate is able to break up dense clinker, all right, but there is no need to produce it. Loose clinker is handled as well.

At our cement plant, the combination of grate, cone-shaped sintering zone, good insulation and interground fuel brought an unprecedented improvement in clinker quality. The reduction rate is

Please turn to page 99

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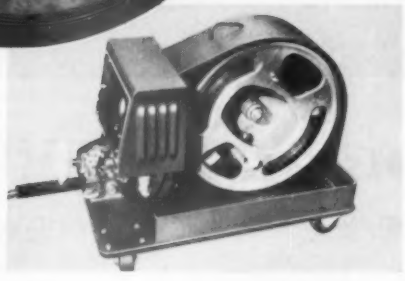

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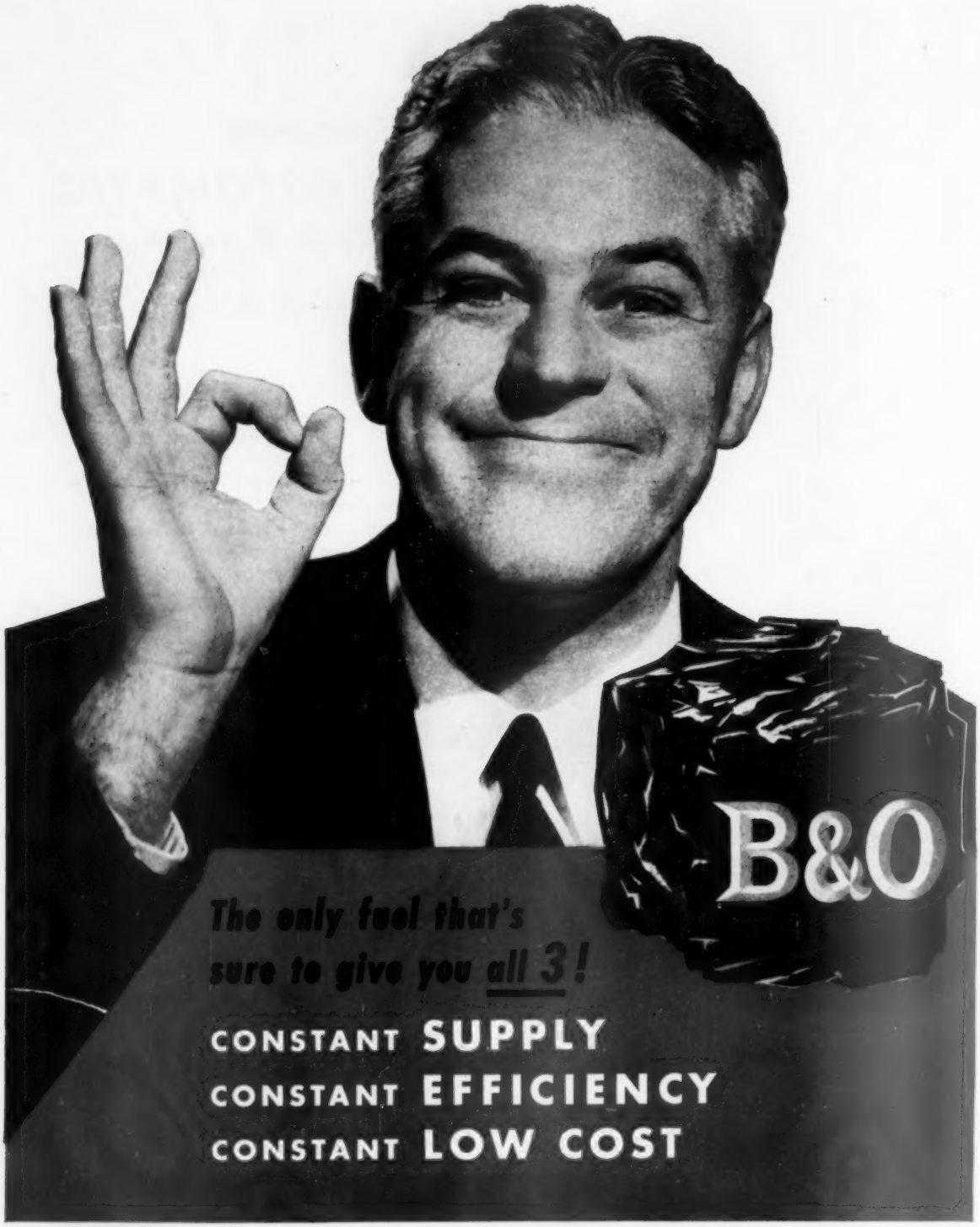

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Well burnt pelletized clinker, above, is porous, easily ground and of high quality. Underburnt clinker, top right, is harmless if not present in excess. Overburnt clinker, bottom right, is dense, causes bleeding, irregular setting of concrete

Shaft kiln *continued from page 96*

.2 mg. of oxygen per gram of clinker, compared with .6—or even more—before these changes were made. Along with the low fuel rate, the kiln output was increased, yet kiln operation is more quiet than before. No flooding occurs and no crater holes are formed. Kiln feed is fully automatic, and this gives still more stabilization. One operator is able to handle two or more kilns. With conventional grates we could not succeed with automatic feeding of the kilns.

Automatically fed kilns have an even flue-gas temperature. There is no danger of water condensation, and as a result electric precipitators can be used safely.

The disadvantages of the conventional shaft kiln must be considered for a better understanding of the progress we have made. Two separate questions always come up, quality and fuel economy. Our experience is that fuel economy results in quality improvement and vice versa. That seems to be a paradox, but it will soon become clear.

Three kinds of clinker are typical of the shaft kiln—underburnt, well-burnt porous clinker and overburnt. Frequently all three occur at the same time, in varying proportions.

Underburnt clinker can be recognized very easily, and its presence is often considered a criterion of poor quality by the layman. In fact, due to its light weight, its quantity is often overestimated, and many people confuse it with half-burnt rotary clinker. The latter, however, is something quite different; because incomplete sintering causes expansion, it is very dangerous indeed.

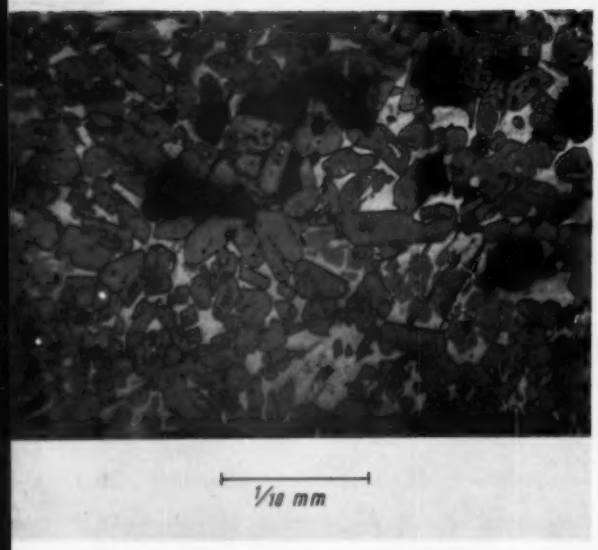
With the shaft kiln, incompletely sintered clinker does not occur in noticeable quantity. Shaft kiln underburnt is yellow, has not been sintered and sometimes is not even calcined. It does not expand. Strength will not be affected unless unusually large quantities are produced. Usually, quantities of two to three percent of underburnt clinker improve plasticity and initial strength and are quite desirable.

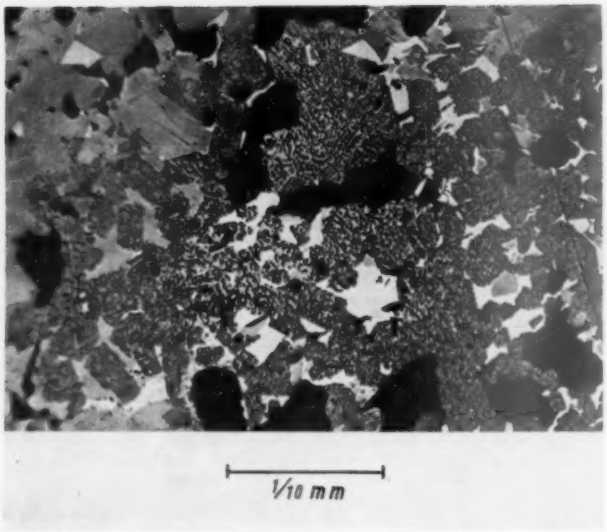
There are reasons, however, for the kiln operator as well as the layman to dislike underburnt clinker. Large quantities indicate that the kiln is out of order, or soon will be. The air pressure rises, the air flow is reduced and output drops. The presence of underburnt, by the way, does not necessarily mean that the mix lacks fuel. Frequently underburnt occurs simultaneously with overburnt.

A very small percentage of underburnt affects the Blaine test considerably. The Blaine method, therefore, should not be used for shaft-kiln cements. We use the Analytical Separator of "Alpine," Augsburg, which is a more practical version of the Holderbank separator or Flurometer. The plus 34-micron value corresponds well to strength.

Typical well burnt clinker has a loose or porous structure. Because of the grinding action of the grate, shaft kiln clinker usually is coated with

Please turn to page 100





Magnified sections from clinker show well-burnt, left, and overburnt, right. Former has even grain size. Latter has uneven grains, free lime which will react later, cause irregular setting, bleeding

Shaft kiln *continued from page 99*

greyish or yellowish dust. For inspection, dust should be removed by an air-hose. The clean clinker looks nice and black with sparkling crystals. The original pellets (pelletized feed) are barely changed.

The porous structure guarantees full oxidation, good quenching and good quality. Good porous clinker leaving the kiln is cool enough to be picked out by bare hands. The pellets may be slightly sintered together; the pieces are brittle enough, however, to be crushed under a rubber heel. The exceptionally good grindability of shaft-kiln clinker is generally known.

Overburnt clinker typically looks dense and bulky. Original pellets cannot be identified. The soft, sintering clinker has been deformed to dense, impermeable pieces. The deformation is not necessarily due to high temperature. When the fire is deep, deformation takes place by the weight of the material itself; when the fire is long, there is plenty of time to complete this action. So the expression "overburnt" is not quite exact.

The bulky masses do not offer enough surface to the air. They are eventually broken up by the grate to a handier size but remain too large for efficient cooling. They usually leave the kiln red-hot and are reduced to all hues from brown to white. They contain ferrous compounds and even metallic iron in microscopic droplets. Sulfites and ultramarine are hygroscopic and after some time black spots of iron sulfide appear.

Unlike underburnt, which is relatively harmless, such a dense clinker is inadequate and dangerous. This cannot be seen at first glance. Rotary kiln operators have the habit of judging from liter weight and they will consider such clinker well burnt. This is an error: strength of overburnt is inadequate and there is a tendency to expand and to irregular setting and bleeding of concrete made with it.

It is easy to understand free lime expanding when the lime cannot be combined in ferric compounds. But it is not generally known that in such densely burnt and reduced clinker a considerable amount of C_2S can be decomposed into C_3S and free lime. The decomposition seems to spread like a contagious disease from certain centers, with zones of finer and coarser formations. To the naked eye the clinker looks well burnt and sound, unless the decomposition is complete enough and conditions are given for complete "dusting."

Shaft-kiln cements should be very closely checked for magnesia expansion, unless they produce a porous clinker. We found well crystallized periclase in slowly cooled clinker with MgO content as low as 1.2 percent.

When a conventional size of coal or coke breeze is used, up to 8 mm. diam., the clinker is contaminated by larger ash particles. Around these particles, C_2S is locally enriched and these areas tend to dusting. Such areas around larger coal particles are frequently reduced and white. There is considerably less reduction when the fuel is finely interground with the raw mix, and no ash contamination can occur. (The new process with interground coal was described in ROCK PRODUCTS, September, 1955.)

In judging the quality of shaft-kiln clinker, the main consideration should be how much porous,

Please turn to page 102

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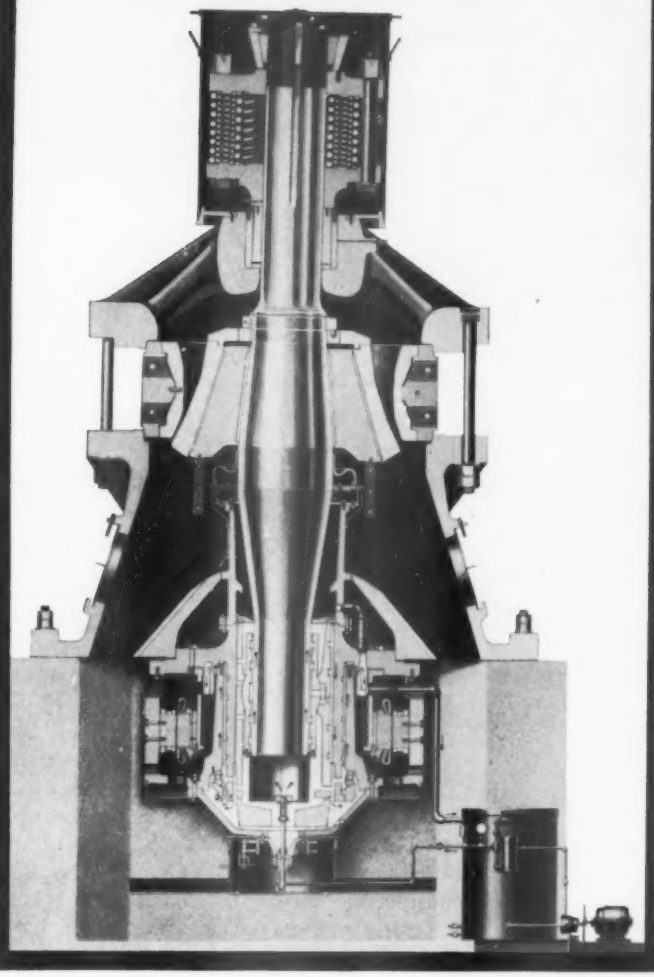

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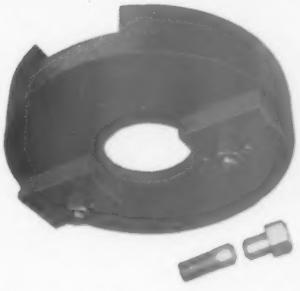

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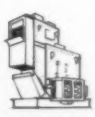

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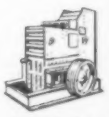
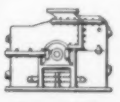


Cuber Junior



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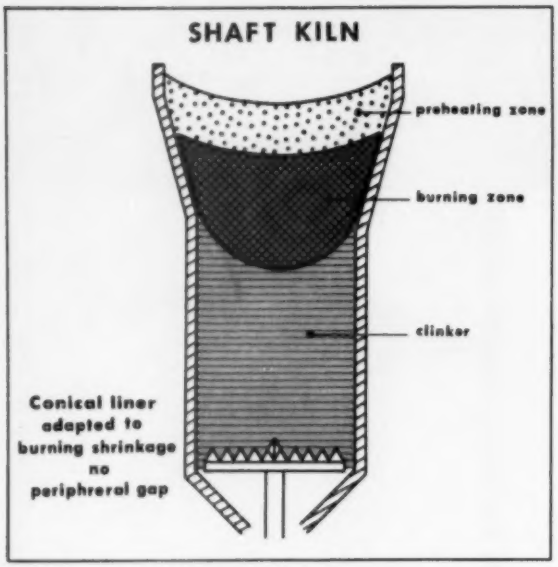

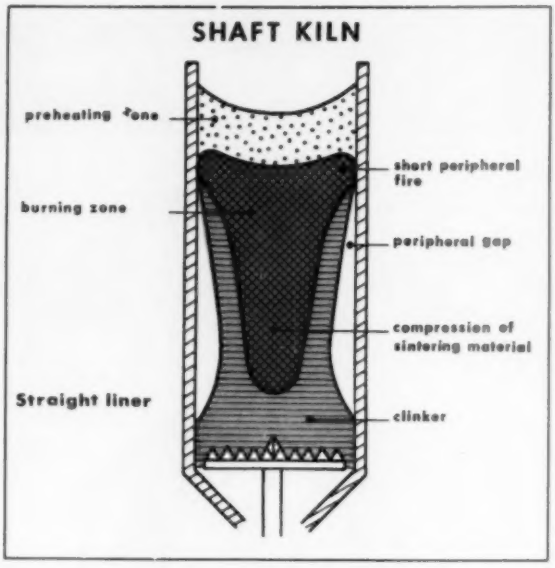

Conical section in kiln liner, above, promotes even burning, top-quality cement. Peripheral gap in plain kiln means uneven burning zone, uneven quality cement.

Shaft kiln *continued from page 100*

well cooled and how much dense, slowly cooled material is present. Dense clinker is always reduced. Therefore, the easiest way to determine the amount of dense pieces is to titrate with permanganate, which will determine the reduction rate. It may be expressed as the milligrams of oxygen per gram of clinker required for full oxidation. Another and perhaps better version is the oxidation ratio in the percentage of iron present. An oxidation ratio of zero means that all iron is present in metallic form; an oxidation ratio of 100 means that all iron is present in ferrous form. The oxidation ratio proved to be the best help in judging the quality. Smaller amounts of underburnt are unimportant, but very large amounts should be considered.

Four factors cause densely burnt, slowly cooled clinker: the conventional grate, burning shrinkage, poor kiln insulation and improper sizing of coal and pellets.

Burning shrinkage forms an air gap at the periphery of the kiln lining. Air escapes through this annular gap, causing lack of air at the center area. That's why the fire at the periphery rises quicker and is shorter than the center fire. The center fire moves downward and becomes very long. As a result, the clinker will be compressed there by its own weight and still less air will be directed to the center. If the peripheral fire rises too high and finally is blown out, it is extremely difficult to regain normal operation. Stability is not regained by itself. The operation is labile.

The conical sintering zone above the new grate helps to avoid formation of a peripheral gap. The shape of the cone must be properly adapted to the shrinkage of the material and the length of the sintering zone. Once the liner is built in the right shape, the length of the sintering zone must be adapted to that shape and maintained properly. At many installations, the length of the sintering zone is not fully under control; in this case proper function of the cone cannot be expected.

Good insulation saves fuel and improves quality. A certain heat loss takes place in poorly insulated kilns, but only at the peripheral parts of the kiln. The amount seems small enough to be neglected, considering the entire output of the kiln. This small peripheral part needs more fuel, however, to prevent its becoming underburnt, and since no extra coal can be added at the periphery, the whole mix must be enriched with fuel. This in turn means a fuel surplus at the center, resulting in a too long, too hot fire and a densely burnt, reduced and poorly cooled clinker. The practical result is the same as that of shrinkage, and both results add to one another.

Of course, the heat loss at the periphery can be met by adding some extra coal at the periphery. We have tested this method with a conventional kiln and it proved to be quite effective. However, continuous operation could not be maintained this way. The clinker became so porous and friable that the conventional grate could not retain it, the gates were flooded and the short sintering zone

Please turn to page 140

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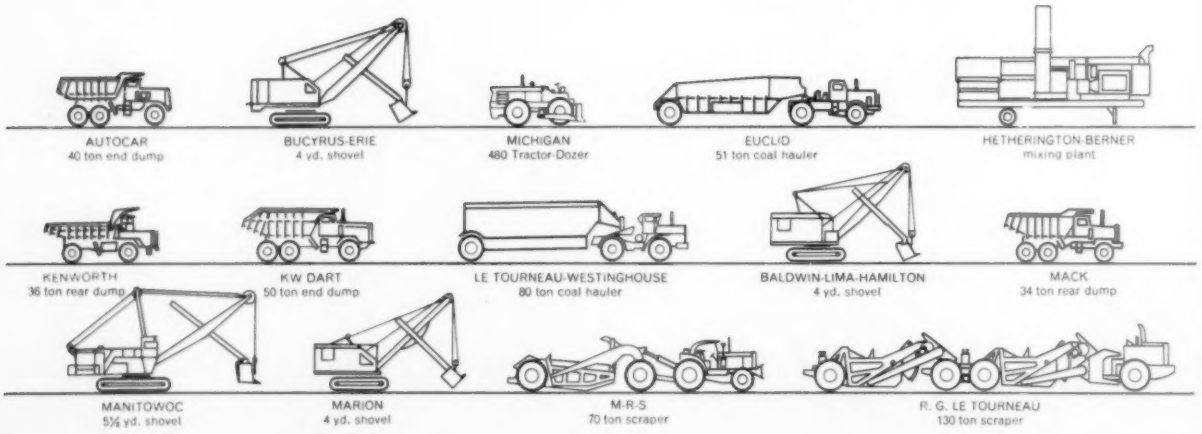

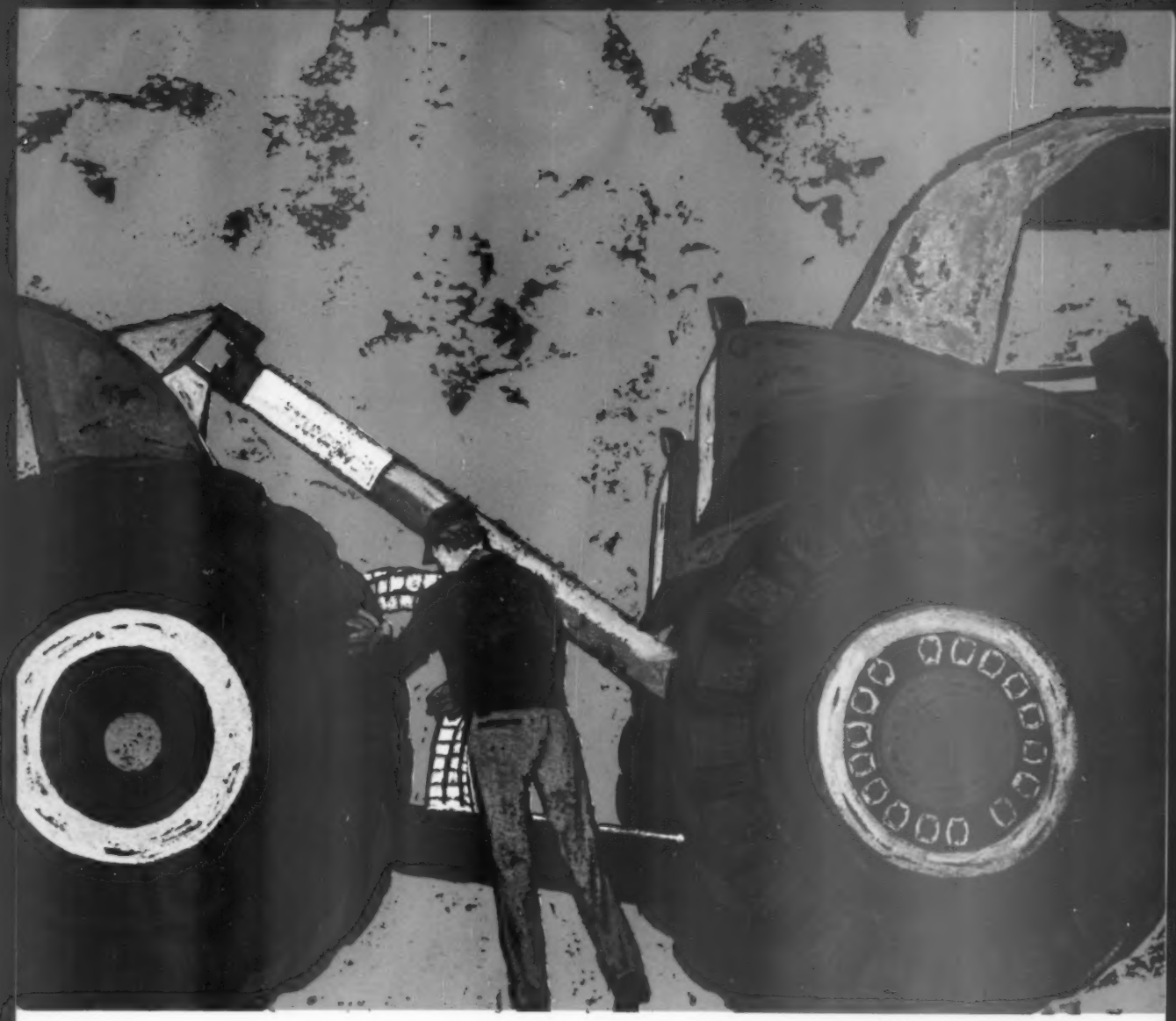

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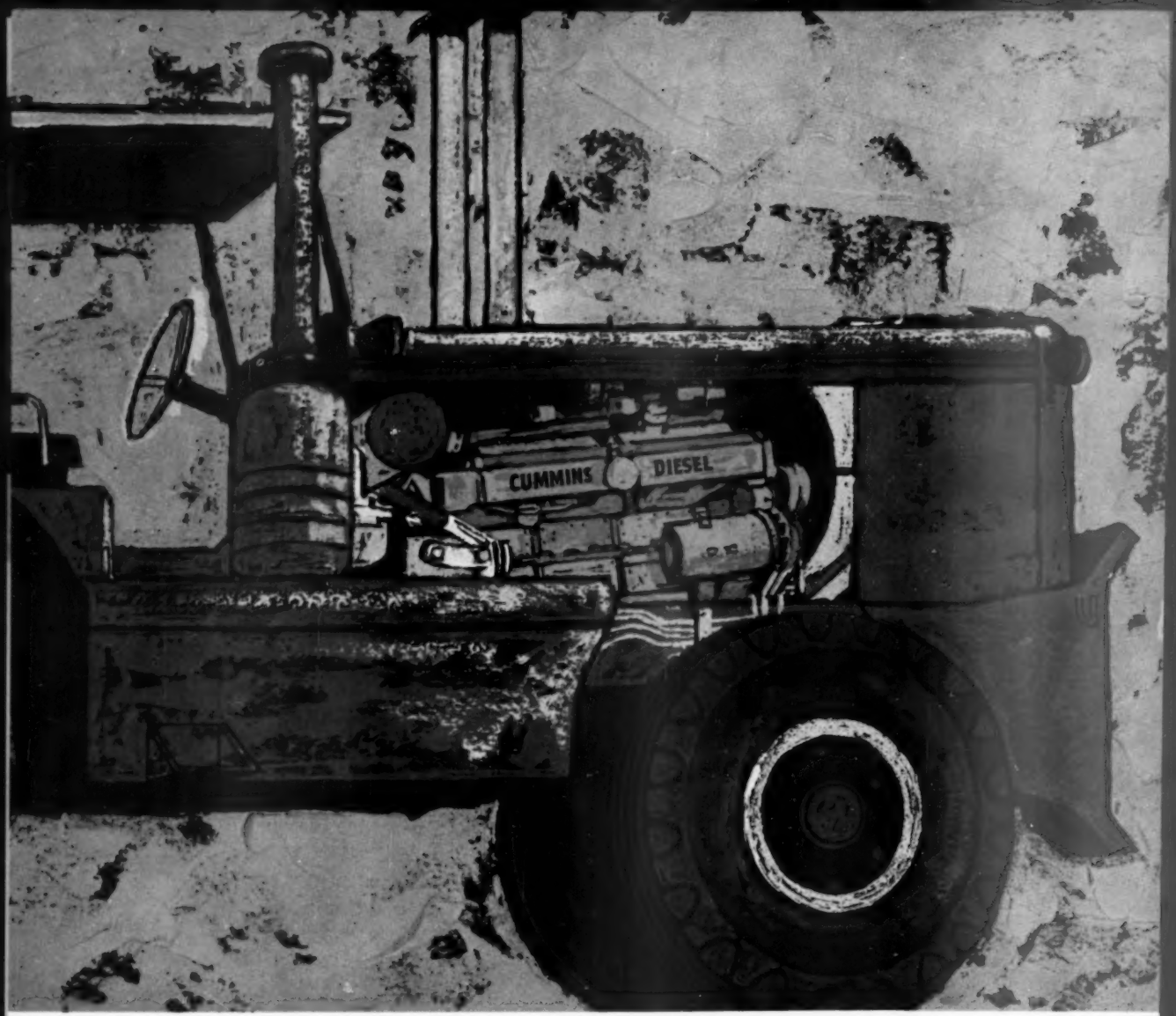

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Different from any prilled ammonium nitrate now on the market, Spencer N-IV reduces priming costs because it can be initiated with a single strand of ⅜-inch detonating cord. There's no need to attach additional material at intervals, or employ other complex priming methods —and you don't have to store high explosives on the job site!

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METHODS OF LOADING AND HANDLING BROKEN rock seldom call for highly descriptive adjectives. But "sensational" is the only word for the loading and hauling at Chemical Lime Company's quarry near Baker, Ore., where one mammoth piece of equipment does both jobs.

Formerly, a shovel was used to load trucks that hauled the raw material from the quarry face to the crushing plant. Now both shovel and trucks have been replaced by an eight-ton-capacity front-end loader, possibly the first installation in a rock products operation.

This giant of its class scoops up an eight-ton load of rock and delivers it to a hopper serving the primary crusher. It takes only one quarry man to keep the plant running at peak capacity. Distance from face to plant is a few hundred yards at most, and it's a down-grade haul all the way.

High in the pine-clad mountains and about 10 miles west of the burning plant is the quarry where there is a proven deposit of 3 million tons of limestone and another 3 million tons as reserve. The high-calcium limestone is exposed by bold outcroppings, so stripping is practically nil. The single face opened at the time of inspection is diagonal to the strike of the vein system and about 100 ft. high. Benching will soon be practiced, and eventually the 260-ft.-high outcrop will be quarried conventionally. Aside from the use of milli-second blasting techniques, no regular pattern has been set for blasting in the quarry.

Chemical Lime Co. placed a one-kiln plant in operation during the fall of 1957, but before a calendar year had passed another 7½ x 150-ft. kiln was added. The plant is located five miles north of Baker, on the rails of the Union Pacific railroad.

A primary and secondary crushing system at the quarry makes the two sizes of stone for the two kilns. The flow of material begins under the hopper serving the primary crusher, where an apron feeder passes the raw rock over a grizzly to the 30 x 42-in. jaw crusher. Crusher product, a minus 5-in. stone, is taken to a 2,000-ton surge pile on a belt conveyor. Through material from the grizzly falls to the same conveyor.

Another apron feeder in the tunnel beneath the surge pile feeds a belt conveyor delivering the stone to the screen house and secondary crusher.

Please turn to page 110

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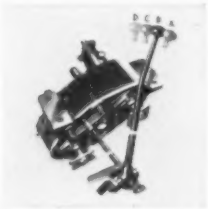
Chevrolet's new 4-wheel drive really digs in and does it . . . enables you to haul through deep mud, snow, swampy areas and up towering grades. With up to twice the traction, wheels are able to grab hold and go!

Here's the latest thing in 4-wheel drives! A rubber-mounted power divider with precision-engineered front axle distributes power evenly to front and rear axles. And when the going is extremely difficult, it directs power to whichever axle is getting the best traction. Result: Your load goes through, whether the road does or not!



EASY SINGLE-STICK CONTROL

Shifting between 2-wheel drive and 4-wheel drive can be done whether the truck is stopped or moving. Lever has these 4 positions: (a) 4-wheel drive, (b) neutral, (c) 2-wheel direct, (d) 4-wheel direct.

CHEVROLET 4-WHEEL DRIVE SUITS MANY MODELS

There are Chevrolet 4-wheel drive *pickups* for ploughing, grading, snow removal jobs, and others . . . *panels* for surveying, delivery, and construction tasks . . . *Suburban Carryalls* for sportsmen and tough cargo-and-passenger-carrying jobs . . . *stakes* for work that calls for heavy back-country hauling . . . and *chassis-cabs* for a broad range of special applications!

PROVIDES POWER FOR SPECIAL EQUIPMENT OF MANY KINDS

With *four* power takeoff outlets, Chevrolet 4-wheel drive can be used to operate saws, winches, generators, pneumatic hammers, post-hole diggers, back hoes, and many more!

Get complete information on new Chevrolet 4-wheel drive!

MAIL THIS COUPON TO COMMERCIAL & TRUCK DEPARTMENT, CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

NAME

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See your nearby Chevrolet dealer about versatile 4-wheel drive in

CHEVROLET TASK·FORCE 59 TRUCKS

CHEVROLET

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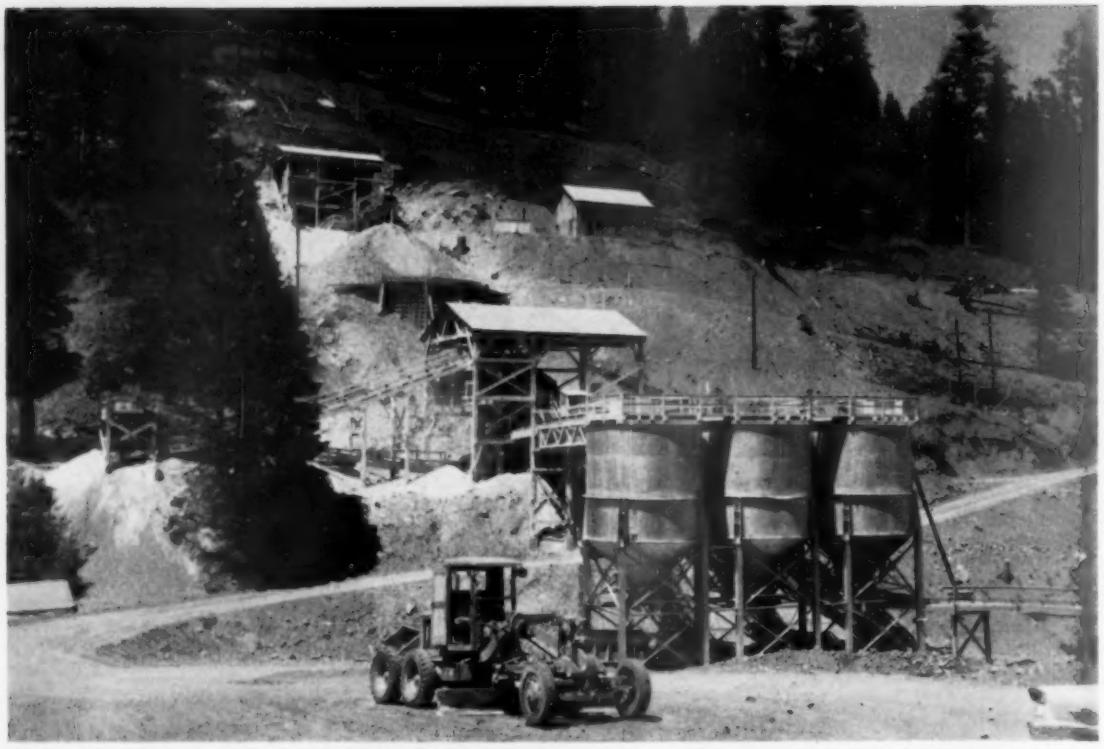


Primary plant at quarry has downhill flow. Sections are primary crusher, surge pile, screen house and three truck loading bins

Front loader *continued from page 108*

A magnet over this belt protects the secondary crusher from tramp iron.

First stop in the screen house is a 5 x 10-ft., double-deck screen. The top deck produces a plus 3-in. stone that is broken in a 3-ft. reduction crusher. Through material from both crusher and screen is conveyed to a 4 x 10-ft., triple-deck sizing screen. Oversize from this screen is returned to the crusher. The finished products, 1½ x ¾-in. and ¾ x ⅜-in. stone, are stored in three 360 ton steel truck-loading bins. Later the stone is hauled to the lime-burning plant in truck-trailer units that carry 26 tons per load. The minus ⅜-in. limestone finds a market in the Baker area, although some of it may need further processing.

Since the quarry and crushing plant are shut down for five to six winter months, 100,000 tons of stone are stockpiled at the lime-burning plant to permit year-round operation. Here's how the stockpile is built up: The trucks dump their loads into a 40-ton-capacity receiving hopper. From the hopper, an inclined conveyor takes the material to the top of a 42-ft.-high trestle and transfers it to a horizontal conveyor. A tripper makes it possible to discharge the stone at any point along the 700-ft. length.

Stone from various parts of the quarry is piled as received to effect a rough blend, but the sizes are separated for uniformity in burning, one kiln utilizing the 1½-in. feed and the other, the ¾ in. The 700-ft. reclaim tunnel beneath the stockpile has 16 draw points for loading out onto the belt conveyor operating in the tunnel. This belt carries the stone to a 50-ft. bucket elevator that delivers to a dry, double-deck vibrating screen. Here, the stone is re-separated into the 1½ x ¾-in. and ¾ x ⅜-in. sizes. These products are stored in 50-ton-capacity kiln-feed bins.

The kiln-feed is regulated by automatic weighing feeders. The two kilns—nicknamed "Roaring Mary" and "Purring Frances"—are fired by combination gas and oil burners. Natural gas became available in the past year in the Baker area and oil firing is expected to be resorted to only in the winter months. Each kiln is turned by a 40-hp. motor. In case of public utility power failure, a 75-kva. gasoline engine generator can supply standby power.

Hot exhaust gases from each kiln go through a dust chamber to four cyclone-type dust collectors and then to induced-draft fans.

Mounted on the kiln control panel, which is located inside a pressurized cubicle, are ammeters indicating current draw on the kiln and fan mo-

Please turn to page 112

MAGNECON*

meets the needs for hot zone linings

The refractory lining of rotary cement kilns must pick up and hold a sound coating. Whatever your burning temperature, silica ratio, frequency of mix changes or shutdowns, uniformity or otherwise of kiln feed analysis and load — the soundness of the protective coating on the hot zone lining is a vital factor in your production and operating economy.

Under the most varied conditions, "MAGNECON" has proved its ability to pick up and hold a sound coating.

OTHER OUTSTANDING CHARACTERISTICS OF "MAGNECON" BRICK:
Resistance to chemical attack even under the highest operating temperatures.
Resistance to spalling under all operating conditions.
Unique chemical composition.

Please request full information from:

*reg'd. tradename.

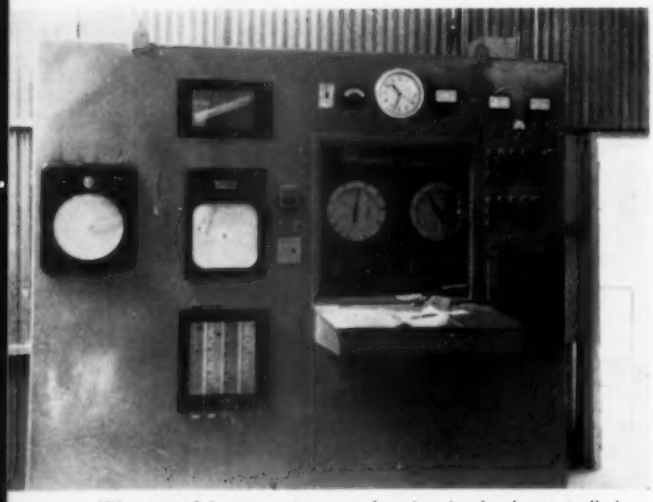
CANADIAN REFRACTORIES LIMITED
CANADA CEMENT BUILDING, MONTREAL, CANADA.

Enter 1067 on Reader Card

Stone ready for burning is kept in 100,000-ton burning plant storage area in distance. Storage is enough for winter

Front loader

continued from page 110



Kiln-control instruments mean burning is closely controlled

tors, gauges measuring and regulating draft within the dust chamber and at the fans themselves, automatic oxygen analyzers, optical pyrometers, and recording and control devices that measure exit and discharge-end gas temperatures. Control instruments for the electrical vibrating feeders to the kilns are also located here.

After cooling to 300 deg. F. or less in a 7 x 60-ft. rotary cooler, the lime is transported by conveyor and elevator to a screen for sizing over ¾ and ⅜-in. mesh decks. A third deck can be used to meet any special customers' requirement. The pebble lime is stored in six 70-ton steel bins. The transfer to the elevator and from the screen is made by natural-frequency conveyors. One of the shaking conveyors flares out to a width of about 36 in. near its discharge end and can be used as a sorting table.

Lime may be withdrawn from any of the bins for loading into railroad cars or trucks or may be elevated to a 50-ton surge bin ahead of a hammermill equipped with an air separator. Pulverized quick-lime goes to a cyclone and from there to a 20-ton bin that feeds a two-spout packer or to a screw conveyor and elevator for bulk loading into cars.

Lime to be hydrated may be drawn from any of the four storage bins and is elevated by a screw conveyor to the hydrate feed bin. The feed bin is equipped with high and low-level indicators which automatically control the operation of the elevator and screw conveyors. Depending on its size, lime to be hydrated may be transferred directly or may first be ground in a swing-hammermill. Hydrate is prepared continuously in a six-tube hydrator that is fed from the 15-ton surge bin by a constant-weight feeder. The hydrator is rated at 12 tph.

The finished hydrate is elevated to the top of

Please turn to page 143

Crawler-mounted Lima Type 44 1-cu. yd. shovel loads sand and gravel into automatic feeder of Lima Austin-Western 101-SE Crushing and Screening Plant.

High output LIMA 44 shovel daily feeds over 1000 yards to portable crusher

"It takes a lot of digging to keep pace with a crusher plant that chews up over 1000 cu. yd. of gravel and rock daily," says John G. Yerington, Benton Harbor, Mich., contractor.

Lima works hard

"We get a lot of work out of our Lima 44 shovel. It works hard under rugged conditions, yet maintenance is low and we've had very little downtime with it.

"It has the built-in quality features you expect of Baldwin-Lima-Hamilton equipment. Besides the Lima 44, I have five Lima Austin-Western crushing and screening plants, plus three Austin-Western graders, five A-W rollers and an A-W hydraulic crane."

The Type 44 can be used interchangeably as a 1-yd. shovel, 25-ton crane, dragline or pullshovel. Available with crawler, truck or wagon mounts. Gas or diesel engine—torque converter is optional. Boom assembly or disassembly extra easy with pin or butt connections. Low gravity center. Large free-acting clutches—easy to operate and adjust.

Minimum Maintenance

Type 44, like all Limas, is designed and quality built to outperform with minimum maintenance requirements. Let a Lima tackle your toughest job. There's a type and size just right for your needs. Cranes to 110 tons, shovels ½ to 6 cu. yd., draglines variable.

Contractors everywhere are sold on Limas. Find out why! See your nearest Lima distributor or write to us now. You'll profit with Lima!

Lima Austin-Western portable 101-SE Crushing and Screening Plant teams with Lima Type 44 shovel for high daily production.

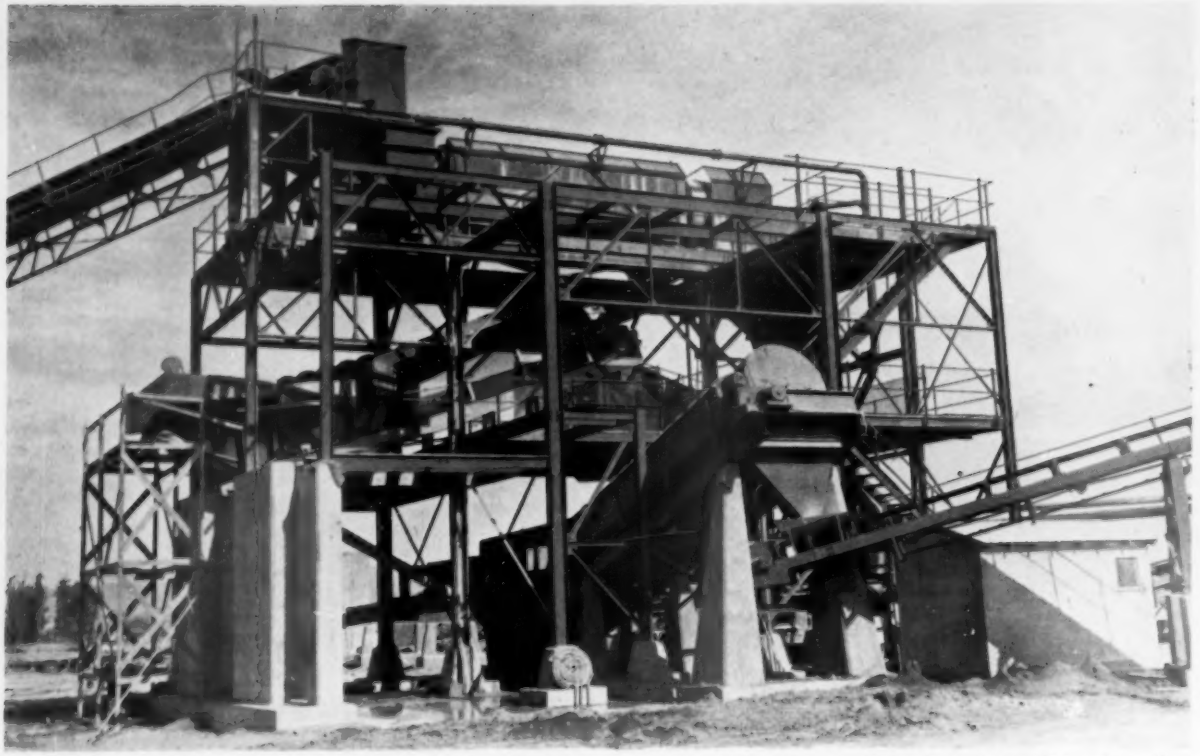
DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

596

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment



Equipment in first of four plant sections insures a clean product by giving sand a scrubbing, washing, rinse and a second washing. Equipment, top to bottom, is scrubber, 78-in. diam. fines screw, vibrating screen and second large screw

Is clay in pit run your problem?

Rhodes & Jamieson's Pleasanton layout is one answer

by Walter B. Lenhart

WHEN RHODES & JAMIESON, LTD., Oakland, Calif., wanted a new sand and gravel plant, it decided to add to the size of the plant over a period of time, and to use Rhodes & Jamieson men for much of the construction work. This planning kept initial capital outlays to a level lower than otherwise possible.

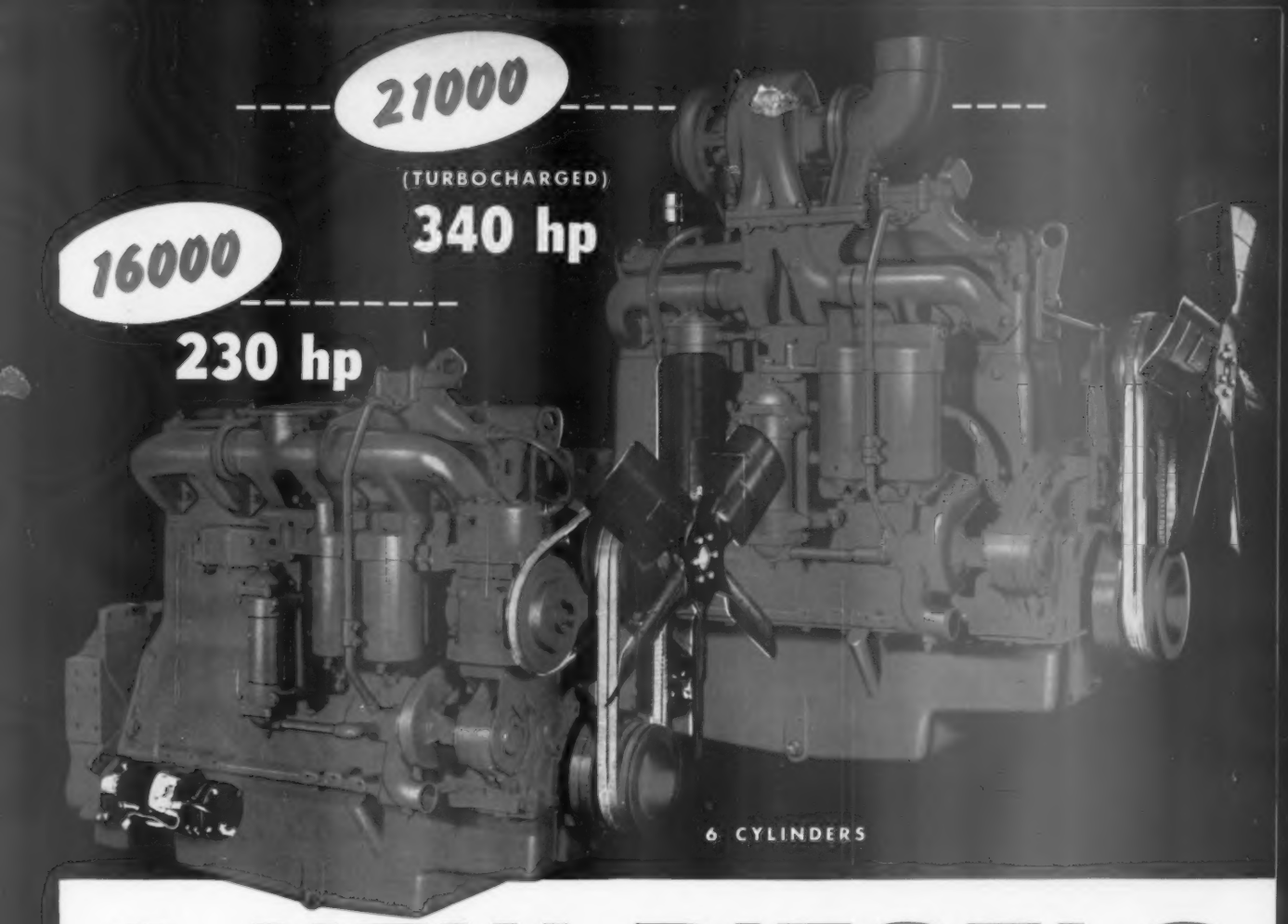
The new plant, located in Pleasanton, east of downtown Oakland, began operations in 1957. It currently has a capacity of 400 tph., but additions are scheduled which will double plant capacity without interruption of present operations.

The company owns 500 acres of gravel-bearing ground. Raw materials from this deposit are intermixed with variable amounts of clay, and one of the features of the new plant is the use of modern, large-capacity equipment to thoroughly remove this clay from sand and both crushed and uncrushed gravel. A four-stage, 10 in. diam. deep-well pump delivers 1,800 gpm. of fresh water to the plant for washing and scrubbing. Concrete sand and seven sizes of washed gravel are produced. Expansion plans call for four additional sizes of washed crushed rock.

With minor exceptions the plant, built of steel and reinforced concrete, is a straight-line operation. The four towers or sections are adequately spaced and built in a line. Belt conveyors are used throughout. Even under almost continuous construction, housekeeping is of a high order.

One deviation from the straight-line operation is the recent addition of a rod mill to manufacture sand out of pea gravel. This part of the operation is at right angles to the main structures. Washed pea gravel, removed in the first screening tower, is ground-stored over a reclaiming tunnel. The reclaiming belt delivers to a bin over the rod mill, and a 4-in. sand pump returns the rod-mill product to the same screen that removes the pea gravel.

Please turn to page 116



2 NEW DIESELS
THAT GIVE YOU . . .

More Horsepower

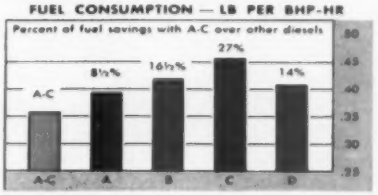
With 340 hp in the turbocharged 21000 and 230 hp in the 16000, you have the power to operate smoothly under extreme load conditions.

More Torque

. . . throughout the operating range of speeds. Torque is consistently high . . . provides the "umph" to do the job. Walks into and *through* heavy loads.

Greater Fuel Economy

This chart compares fuel economy of the new Allis-Chalmers engines to others in their horsepower class. Economy like this gives you as much as from 1 to 2½ hours of extra production a day doing the same kind of work — using even less fuel.



Clean Exhaust

These diesels have a new combustion system that provides *thorough* mixing of air and fuel for complete combustion. Fuel makes horsepower — not smoke!

Clean Design

Modern engineering means greater dependability, less maintenance, easy installation. To further simplify servicing, there is 98 percent interchangeability of parts between the Allis-Chalmers 16000 and 21000 engines.

Let your Allis-Chalmers dealer show you the many other features that put the *profit* in performance. Write for FREE new 16-page bulletin BU-540. Allis-Chalmers, Milwaukee 1, Wisconsin

ALLIS-CHALMERS

POWER FOR A GROWING WORLD

A-C ALLIS-CHALMERS

BE-13

Two scrapers do both stripping and aggregates hauling

Last two towers in line of four are for final sizing; seven bunkers beneath each hold 1,200 tons of finished material

Clay problem *continued from page 114*

The second structural exception is the concrete-sand stacker belt. This belt delivers to a winged stacker belt, which currently ground-stores the material over a reclaiming tunnel. No masons sand is produced at the present time.

At the pit, stripping averages about 14 ft. This material and the sand and gravel above water level are excavated and brought to the plant by two loader-scrapers, each hauling a payload of 35 tons. The gravel above water is about 70 ft. thick, and there is much more material below water. The loader-scrapers deliver to a hopper over a 48-in. belt feeder, which serves the main belt to the first tower.

At the first tower all pit material goes through a large-capacity rotary scrubber-screen, which uses 1,400 gpm. of recirculating water from an 8-in. pump. This water comes from subsequent screens and scrubbers. The primary rotary scrubber takes out a minus ½-in. product and sends it to a 78-in. sand preparation machine, which in turn delivers to a two-deck, wet vibrating screen where clean water is used.

This screen removes the pea gravel on the lower deck. The pea gravel is then belt-conveyed to the storage pile or to the plant screens. The minus ¼-in. sand from the vibrator flows to a second 78-in. sand preparation machine, from which the concrete sand is belted to storage. Overflows from both screws go to three large settling ponds operating in series.

Thus the sand is given a scrubbing, an appreciable amount of attrition and washing in the first screw, a thorough rinse with clean water at the vibrating screen and final attrition and washing at the last 78 in. diam. screw.

The primary rotary scrubber has a 6-ft. end section of 3 in. diam. openings. The minus 3 in. and the oversize from the vibrating screen are conveyed to the second tower. The plus 3-in. material falls to a jaw crusher, and the product of this unit is carried to the second tower on the same belt.

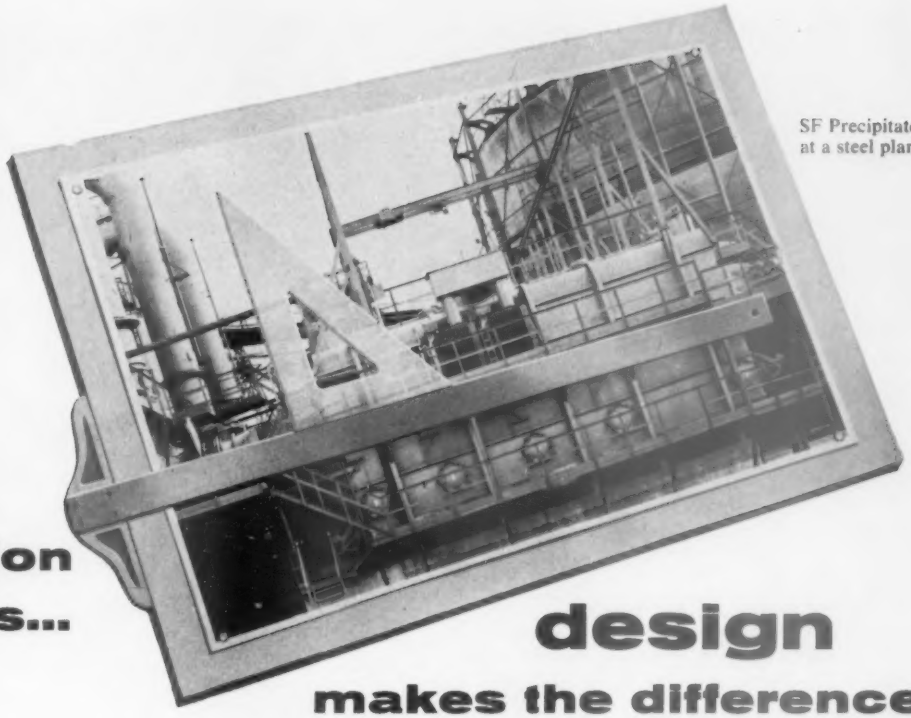
At the secondary scrubbing and crushing section, the gravel—all plus 7/32 in.—goes to another large-capacity rotary scrubber-screen, to which 1,400 gpm. of fresh water are delivered. This scrubber has 15 ft. of ¼-in. openings, and all through-screen material flows by gravity back to a rectangular collecting tank near the first tower, where the 8-in. pump picks up the recirculating water and delivers it to the first rotary scrubber.

The plus from the second scrubber-screen falls to a two-deck "control" screen whose top deck varies from 1½ to 2½ in., depending on the products wanted. The oversize from this screen drops to a 4¼-ft. secondary cone crusher. The throughs from the crusher are conveyed back to the main conveyor serving the second tower. Since throughs from the second scrubber are returned to the first, any minus ¼-in. crushed particles are blended into the concrete sand.

Third tower. Next, the intermediate material from the top of the lower deck of the second vibrating screen is belt-conveyed to the third tower, which features two double-deck, wet final screens, or it can be diverted to the crusher. Finished products from these screens fall to storage compartments below, with remaining fractions belted to the fourth tower, which also has two double-deck wet screens for final sizing.

Under these four screens are seven bunkers,

Please turn to page 118



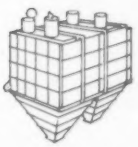
SF Precipitator at a steel plant.

In Dust Collection Systems... design makes the difference

Higher efficiency of Buell 'SF' Electric Precipitators is the result of exclusive engineering features. For example, Buell's *Spiralectrodes* emit 50% to 100% more electrons than other types . . . and *maintain* their efficiency. Positive gas flow control through adjustable baffles prevents scouring and eddying. And Buell's Unique Continuous Cycle Rapping practically eliminates "puffing".

BUELL CYCLONES

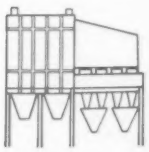
Lower installation cost of Buell's time-proved simplified design makes erection faster and easier. Spiralectrodes, for example, are self-tensioning, require no weights. Flexibility of power supply means easier installation, operating safety.



"SF" ELECTRIC PRECIPITATORS

Lower maintenance cost is the result of many details of superior design. And sectionalized design permits shutting down part of a unit without interrupting service in the rest of the unit.

Get full information: write for a copy of "Buell SF Electric Precipitators", a 22-page booklet. Write to Dept. 17-B, Buell Engineering Co., Inc., 123 William Street, New York 38, N. Y.



PRECIPITATOR-CYCLONE COMBINATIONS

buell®

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

Enter 1016 on Reader Card

Product goes from bunkers to truck load-out bins, right, or to car and truck load bins, center. Concrete plant is at left

Clay problem *continued from page 116*

of reinforced concrete with heavy concrete dividing walls. Each bunker holds 1,200 tons of finished material. Under this row of bins is a concrete reclaiming tunnel which is large enough for two parallel belts, although only one is currently installed. Gravity-type quadrant gates, suitably calibrated for blending, feed the reclaim or main load-out belt, a 36-in. unit. Water from the tunnel drains to a sump where a small pump is provided.

Loading out. The reclaim belt delivers to a final rinse screen, over seven cylindrical truck load-out bins. As an alternative, the material can pass to another belt conveyor serving Rhodes & Jamieson's nearby ready-mixed concrete plant.

In 1958, an additional belt conveyor and four 70-ton capacity bins were built. The belt and bins will be used for car or truck loading. The plant is served by the Western Pacific railroad. All materials trucked from the plant are weighed.

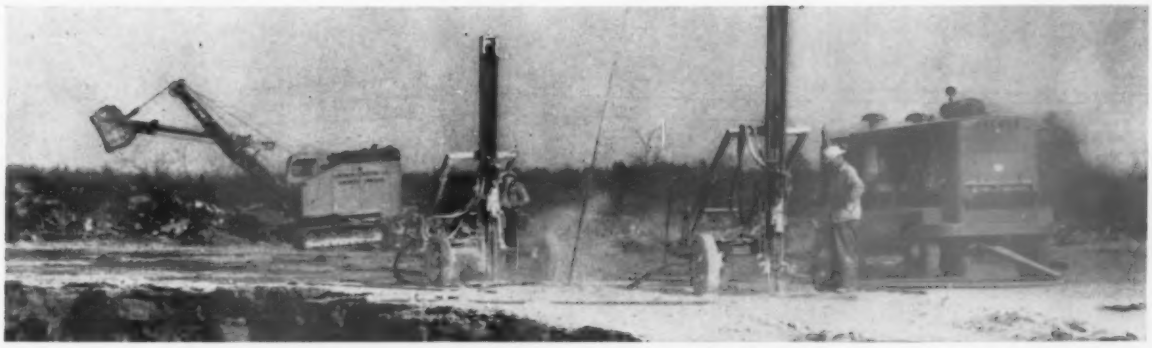
It is estimated that 60 percent of the current 400-tph. production is plus ¼ in., minus 2½ in. Natural sand (minus ¼ in.) accounts for 33 percent and 7 percent is waste. The recently completed rod mill, which manufactures sand out of pea gravel, has a capacity of 30 tph., but this will not affect the overall figures. It will, however, reduce the percentage of gravel produced.

Rhodes & Jamieson, Ltd., is a longtime producer of aggregates and ready-mix, as well as a merchandiser of building supplies. The company has ready-mixed concrete plants in Oakland, San Leandro, Centerville, Pleasonton and a new one being constructed in Richmond, Calif.

MAJOR EQUIPMENT USED AT RHODES & JAMIESON, LTD.

Plant design	Universal Engineering Co.
Primary crusher, 10 x 36 in.	Straub Mfg. Co., Inc.
Secondary crusher, 4¼ ft. cone	Nordberg Mfg. Co.
Sand preparation machines, 78 in. (2)	Western Machinery Co.
Belt conveyors (belts)	American Rubber Co.
Primary scrubber, 72 in. x 33 ft.	Bodinson Mfg. Co.
Secondary scrubber, 72 in. x 29 ft.	Bodinson Mfg. Co.
Vibrating screens (6)	Bodinson Mfg. Co.
Rod mill feed bin	Bodinson Mfg. Co.
Truck load-out bins (7)	Bodinson Mfg. Co.
Car load-out bins (8)	Noble Co.
Rinsing screen	En-Jay Mfg. Co.
Rod mill, 5 x 12 ft.	Mine & Smelter Supply Co.
Sand pump, 4 in.	Mine & Smelter Supply Co.
Pressure pumps	Pacific Pump Co.
Deep-well pump, 10 in.	Byron Jackson Iron Works
Recirculating pump, 8 in.	Kimball Krough
Tractor, rubber-mounted	Wagner Tractors, Inc.
Road maintainer (grader)	Allis-Chalmers Mfg. Co.
Front-end loader, ¾ cu. yd.	Mixermobile Mfrs.
Clamshell crane, 38-B	Bucyrus-Erie Co.
Clamshell crane, 30-B	Bucyrus-Erie Co.
Bulldozer	Caterpillar Tractor Co.
Scrapers (2)	Caterpillar Tractor Co.
Truck scales	Fairbanks, Morse & Co.

END



Logging 500' per shift in limestone with low cost Jaeger air.

Jaeger "600" and dual drill rig, both truck mounted, handle several locations.

Track drills and readily truck mounted Jaeger rotaries make mobile "teams."

Only Jaeger gives you 600 cfm @ 1700 rpm

Using the same GM 6-71 diesel engine as all other "600" rotaries, your Jaeger gives you full rated capacity at 100 rpm slower speed (1700 instead of 1800). In 8 hours full load operation that totals 48,000 fewer revolutions, saving miles of engine piston travel and pounds of fuel.

Because all operation is below the continuous horsepower curve, engine maintenance is at a minimum. As for the compressor unit itself, many Jaeger rotaries have logged more than 8000 hours without requiring the replacement of a single vane.

125, 250 and 365 cfm models are comparable (1700 rpm full load speed instead of 1800 up). The difference puts money in your pocket. Ask any Jaeger user — or ask us for Catalog JC-7.

THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio

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Enter 1086 on Reader Card

Trap rock plant is geared to fill any size needs

Complex chute setup helps three screens, three crushers make many sizes

INABILITY TO MEET CRUSHED-STONE SIZE specifications should never lose business for Gainesville Stone Quarry. The firm's new trap-rock crushing and screening plant near Gainesville, Va., can produce practically all standard sizes with a minimum of screen-cloth changes and without making any odd or unsalable sizes.

This flexibility has been achieved by the precise placement of remarkably few pieces of big equipment—just three crushers and three vibrating screens. These machines have been carefully worked into a system of belt conveyors and complex chutes controlling the flow of rock. Output is 100 tph. of finished aggregates. In day-to-day operations, the plant produces seven sizes of crushed aggregates, including four sizes meeting Virginia Department of Highways Specifications at this writing. These seven products fill most of the size-needs of the area around Washington, D.C.

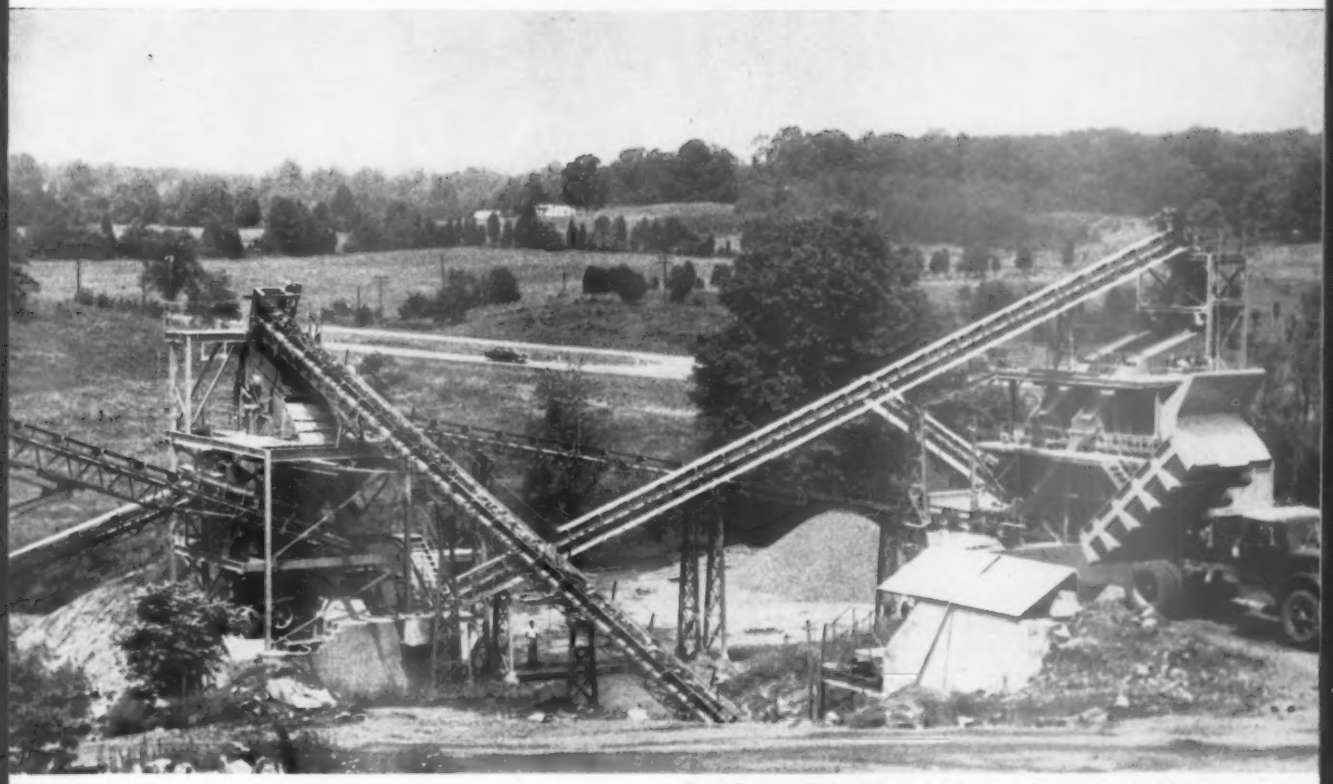
The crushing and screening plant takes the attention of just three men. Gates in the chutes are remotely controlled, electrically operated and interlocked with conveyor motors for rapid, positive control. Five men in the quarry and a scale man at the office complete the operating crew, which works under the supervision of John Monteith.

The whole screening and crushing plant was designed to take a very minimum of space on the company's long, narrow property and yet to provide for rapid loading of trucks. The location of the plant—right on a four-lane arterial highway leading straight to Washington—has proved to be an advantage. So far, most of the new plant's output has been shipped by truck. But as the market for this blue-gray stone expands, a rail spur about a mile away will permit rail shipments.

The first year of operating the quarry since it was opened up in April, 1958, has been especially difficult. Overburden varies in depth. It is practically impossible to strip it off cleanly because of fissures and seams in the nearly vertical rock formation. The uneven top of the exposed rock makes it difficult to drill; the depth of the hole must range from 20 to 30 ft. to make a level floor in the quarry after blasting. However, when the quarry goes to bench operation some of these problems will be relieved.

Blasted rock is loaded out to one of two 15-ton end-dump trucks with a 1¼-cu. yd. shovel. Whatever disadvantage this small bucket may have in slow loading speed is overcome by its inability to load the trucks with anything larger than about 30-in. cubes of rock. This saves wear and tear on the two trucks, on the steel truck dump hopper, on the 48-in.-wide apron feeder and on the 36 x 42-in. primary jaw crusher. The trucks are not loaded heavily as long as the quarry face is close to the crusher; frequent 10 to 12-ton loads keep the primary jaw crusher humming.

Flexibility was built into the design of the new



Overall view of plant shows haulage truck dumping into hopper above primary crusher, primary tower in center, surge pile at left and secondary tower at right

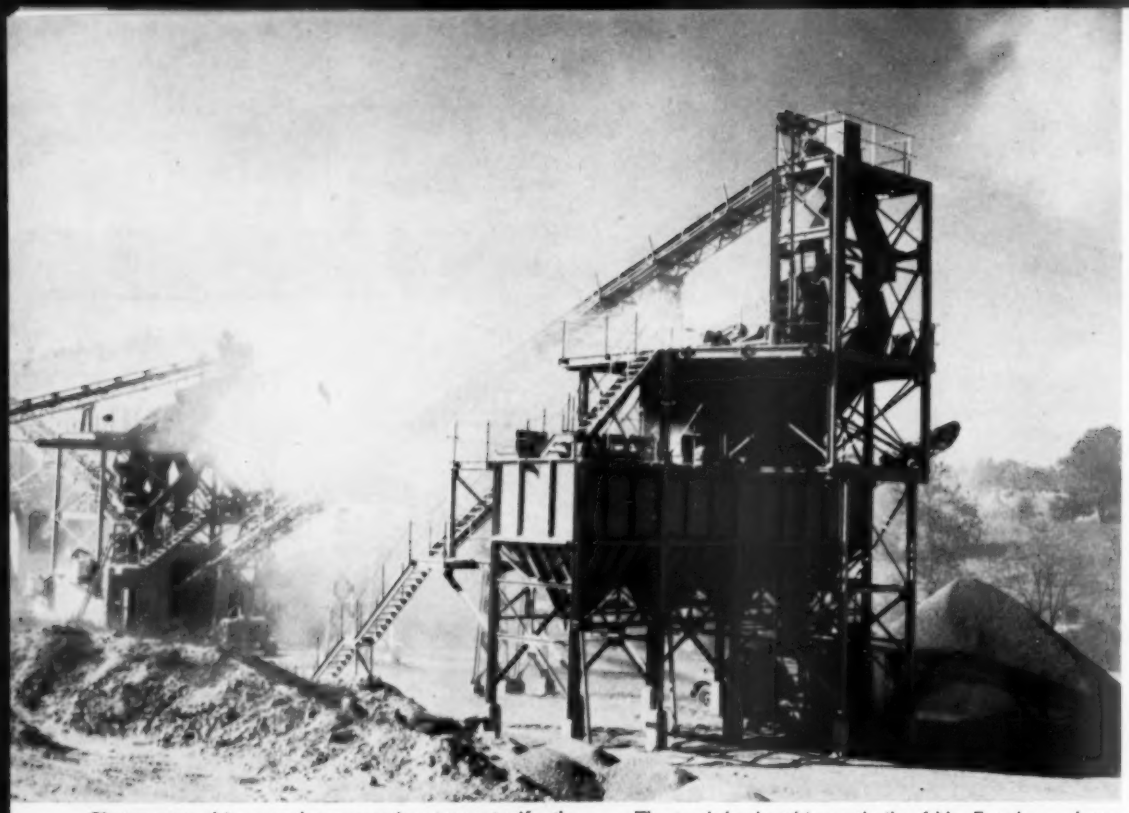
plant by permitting the primary crushing and screening part of the plant to operate independently of the secondary crushing and screening section. This is achieved by sending 6 x ¾-in. trap rock from the two decks of the 5 x 12-ft. scalping screen to a 4,000-ton surge storage pile at the rate of 200 tph. Then, when the quarry and primary plant are not operating, it still is possible to process aggregates through the secondary crusher and screening plant by drawing material from the surge pile at about 100 tph.

Important function of the primary vibrating screen is the removal of "dirt." This is a minus ¾-in. fraction that contains all the top soil, clay and gravel remaining after stripping. But it does have a large amount of small rock made by blasting and by the primary jaw crusher. This by-product finds a ready market in nearby contractors, who use it for road base. This material is usually stockpiled on the ground, but a flop gate in the chute under the scalping screen can send it through to the secondary screening tower, where it is dropped into a 40-ton truck shipping bin.

Everyday operation of the scalping screen sends only the 6 x 2-in. rock to the surge pile. However, when the surge pile is full, this size can be dropped into a 4¼-ft. secondary cone crusher, by-passing the surge pile. The capacity of the crusher when set at 1¼ in. is about 175 tph., enough to handle the full volume of material off the screen. Normal procedure is to feed the crusher at a uniform rate up to 100 tph., by using a vibrating feeder to draw rock from storage to a belt conveyor. This eliminates surges of heavy rock and lets the crusher operate steadily and efficiently.

The chute taking the 2 x ¾-in. rock from the lower deck of the scalping screen has been arranged to send this size to storage with the large sizes, to the secondary crusher or to a third cone crusher. This is a 3-ft. unit with a capacity of about 70 tph. when making ¾-in. aggregates. It makes fine sizes and takes care of material recycled back from the secondary screening tower. Crushed stone from both crushers is dropped down to an inclined belt conveyor to be taken to the top of the secondary screening tower.

A three-way chute in the top of the secondary tower directs the flow of material. A gate can split the flow of rock between the two screens in any proportion, or it can cause the rock to completely by-pass the screens. This chute is how all minus ¾-in. dirt reaches the truck shipping bin, and how



Chutes atop this secondary screening tower typify the many used at the plant to meet rock size specifications. The truck loadout bins and pile of No. 5 rock are shown. The primary tower with two crushers and screen is at left

Gainesville *continued . . .*

all products from the two gyratory crushers can be put into a bin for shipment as a crusher-run material without further screening. In this case the size of this material is controlled only by the settings of the crushers.

Normal operation of the two 4 x 14-ft., 3-deck vibrating screens yields five products—Virginia specification aggregates Nos. 5, 9, 11 and 12 as well as through-screen fines, usually minus 8-mesh. No. 6 stone will be produced whenever it is needed and a stacker belt carries it to a stockpile. Additional sizes can be made by changing the screen cloths in one or both screens.

Flexibility has been achieved in the secondary screening tower by making each screen large enough to handle the full flow of material from the crushers. In addition, each screen can make a different group of products and send them to storage over a group of three reversible belt conveyors, all oversize materials are sent back to the fine crusher to be recrushed and recycled back to the top of the screen tower.

One of the three horizontal belt conveyors takes the No. 5 stone to a stacker belt to be stored on the ground; this type of unit will also handle the No. 6 stone. The other two horizontal belts serve the three truck shipping bins which hold the three small sizes of aggregates.

Four gates in the chute system under each vibrating screen make it possible to send material from each deck of each screen to storage. Stone from the second deck can be sent back to the fines crusher, joining the material over the top deck, or it can be sent to the No. 5 stockpile or to one of the shipping bins.

Rock from the lowest deck can be dropped into a bin directly below the screen or can be conveyed to one of the others.

Ability to expand is part of the system at Gainesville. In addition to the equipment already on the site, it will be possible to add another fines crusher when more crusher sands are needed. It is expected that a ready-mix plant can be located on the property in addition to the bituminous concrete plant of General Asphalt Co., which now takes much of the new plant's output. **END**

MAJOR EQUIPMENT AT GAINESVILLE STONE QUARRY

Drill	Chicago Pneumatic Tool Co.
Shovel	Manitowoc Engineering Corp.
Trucks, 15-ton end-dump (2)	Autocar Div., White Motors
Front end loader	Clark Equipment Co.
Jaw crusher 36 x 42-in.	Traylor Engineering & Mfg. Co.
Gyratory crushers 4¼ and 3-ft.	Nordberg Mfg. Co.
Shipping scale 30-ton	Winslow Government Scale Co.
Apron feeder 4 x 13-ft.	Hewitt-Robins, Inc.
Belt conveyors and belts (10)	Hewitt-Robins, Inc.
Vibrating screens (3)	Hewitt-Robins, Inc.
Plant design and construction	Hewitt-Robins, Inc.

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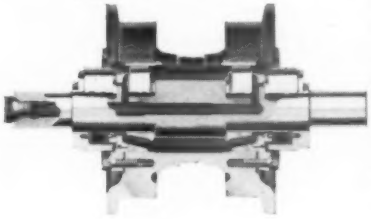

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Complete overhauls are done on preset schedule under preventive maintenance

Preventive maintenance

Here are four practical steps to lower repair costs

by Ernest W. Fair

PREVENTIVE MAINTENANCE is just a waste of dollars—let's save them for repair when it's needed!"

Too often this is the answer the engineer receives when he tries to sell preventive maintenance to his firm. There are occasions when this attitude is justified, for improper preventive maintenance can be a waste of money.

But countless surveys in this field and others have shown that wise application offers untold profit potential by keeping every piece of equipment operating continuously. There are no curtailments in production where preventive maintenance is properly applied.

These four fundamentals are necessary to proper preventive maintenance:

1. A real desire for preventive maintenance on the part of everyone from the executives who must approve the program budget to the men who handle and operate equipment.
2. Proper engineering application of the program all the way down to the individual machine.
3. A sound inspection system.
4. An adequate equipment cost-card record system and procedure to serve as the "nerve center" of the whole program.

The desire for preventive maintenance should begin at the foreman's level where individual contact is maintained with each employe. Foremen and supervisors have to be sold on the dollars-and-cents value of the program. Then they, in turn, should train employes in the application of preventive maintenance to their own equipment.

"I always look for an opportunity to bring this home to my men by example," one supervisor told us. "The easiest way is by showing how a shaft in a piece of equipment could have been saved through preventive maintenance attention to the bearings on that shaft. Whenever a breakdown of this nature used to occur, I'd call the men together and show them just how that particular case could have been prevented. Since our firm has set up a good preventive maintenance program we've had very few such examples, however."

Build up facts and figures to justify the need for improvements. This is usually the responsibility of the engineer in charge. Such measuring fac-

Please turn to page 126

DIAMOND **STATIONARY PLANTS**

How Diamond put a gravel deposit in business

Check This Layout

- a trap loading hopper equipped with a grizzly and plate feeder
- three 24" lattice framed belt conveyors
- 2 wash boxes
- a 3 deck and a 2 deck water screen equipped with spray bars
- a screw washer
- a 10"x36" jaw crusher
- a 30"x20" roll crusher
- a 24" DorrClone
- 4 portable stockpiling conveyors

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

The owner of a Northern Illinois gravel deposit had a problem. A ready market existed for finished aggregate products that could meet the rigid specifications of state and local highway programs. Could such materials be produced from his property in adequate quantity . . . and at a profit. He turned to Diamond . . . today he has a profitable operation.

Experienced engineers surveyed the site, checked the type of material in the pit, verified the finished products wanted, and determined the production capacity that would be needed. Then they submitted detailed sketches, specifications and costs for a complete plant layout. Approval was received and in a matter of weeks another Diamond engineered and built plant was making money for its owner.

Arranged in a space-conserving layout, the plant is producing four profitable materials at the rate of 70 to 150 cu. yds. per hour, depending upon the amount of each product desired; washed concrete sand, washed natural gravel in two sizes (1¼" to ½" and ½" to #4 mesh), and 100% crushed, screened and washed gravel in either 1" to #10 mesh or ⅜" to #10 mesh. All meet state, county and township road specifications.

The entire plant is electrically driven with all wiring underground. It requires a minimum of supervision with one man handling the operation . . . typical of Diamond's thoroughness and ability to provide the best knowhow and equipment for any size job. It's a good example of how Diamond can tie-up high capacity, smooth operation and low production costs in one neat profit package for you. See your Diamond Distributor today.

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GOODMAN MANUFACTURING COMPANY

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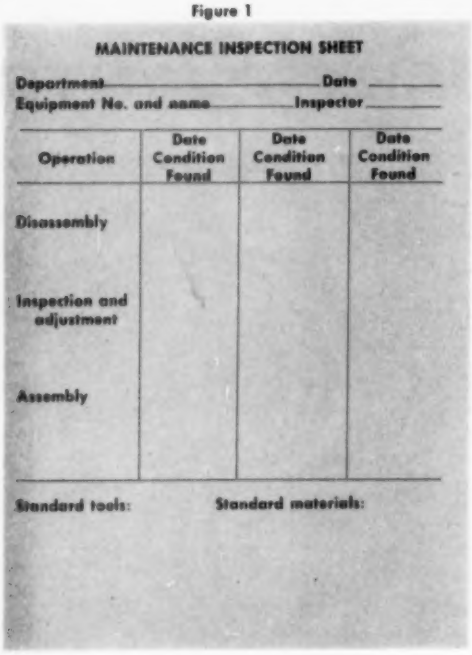
Figure 1



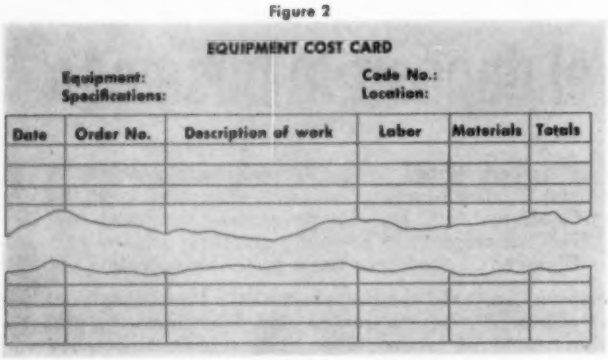
MAINTENANCE INSPECTION SHEET

Department _____ Date _____
Equipment No. and name _____ Inspector _____

Operation	Date Condition Found	Date Condition Found	Date Condition Found
Disassembly			
Inspection and adjustment			
Assembly			

Standard tools: Standard materials:

Figure 2



EQUIPMENT COST CARD

Equipment: Code No.:
Specifications: Location:

Date	Order No.	Description of work	Labor	Materials	Totals

Record cards pinpoint costs, are typical of those in use

Maintenance *continued from page 124*

tors are of great value in convincing management that preventive maintenance is a wise investment, and the same data can be used in training the men who are to put the program into operation.

Such facts and figures come from actual examples in the maintenance history of the firm, figures on cost of operation and many other sources. The important thing is to avoid generalities. For example, the cost of ordinary maintenance as a percentage of total investment may seem to be reasonable, while a breakdown by individual pieces of equipment may show quite the reverse.

Proper engineering is as important to the success of the program as desire, and perhaps it is more often overlooked. The finest preventive maintenance engineering at the top level is useless if there is no understanding at the level of application, however.

The program itself should include a chart or table of organization showing each area of maintenance and the responsibility of each executive, from foremen on up. Very large firms often create a special staff whose sole responsibility is to carry out the maintenance program. In the average-sized or smaller organization, this procedure is economically impossible, so responsibilities must be assigned to the men in charge of the area in which each maintenance procedure centers. These men are then responsible to the engineer who heads the overall program.

A sound inspection program is the third important factor. This phase of preventive maintenance should consist of thorough study of the maintenance needs of every piece of equipment. This data should be recorded and conveyed to the workers who operate the equipment as well as to the men responsible for maintaining it.

"Please remember this important point," one engineer told us. "No matter how good a program you may develop, it will not be worth one red cent unless you pick the right men to do the inspecting and then ride herd over them constantly to be certain that no slacking up occurs in their inspection routines.

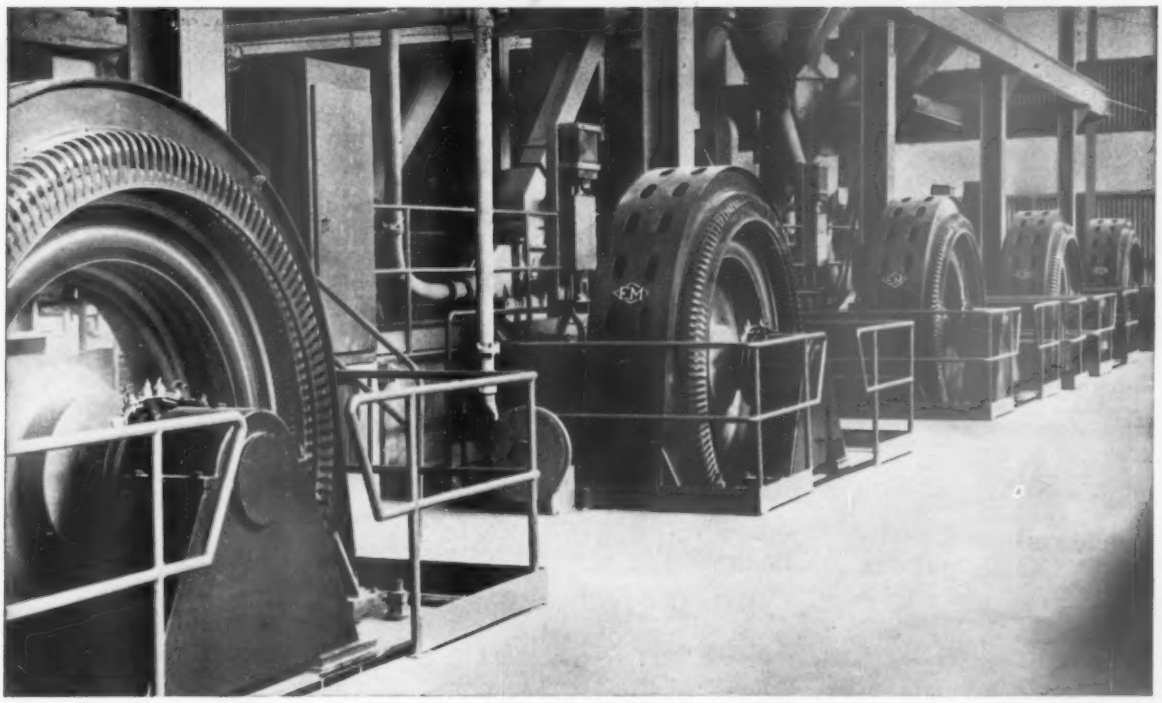
An equipment cost-card record system, the final point, is an absolute essential. These systems are many and varied, since they are designed to fill the specific needs of each individual company. But the card generally should contain the following information:

1. Repair order number and date.
2. Description of work done and material used.
3. Labor and material costs.
4. A periodic summary of data as a basis for maintenance improvement.

The specific equipment card should cover these points:

1. Individual unit.
2. Groups of similar equipment.
3. Utilities.
4. Blanket orders and numbers.
5. Codes to apply for ready reckoning of overall statistics and information.

A maintenance inspection standard operation sheet is also advisable for the entire program (a sample of the type in general use is shown in Figure 1). Figure 2 shows a typical equipment cost-card form. Both are presented not as ideal forms to follow but as established, working systems upon which the individual executive can build his own records. These records can help him to have a workable preventive maintenance system in his organization. END



Notable for advancements in safety and simplicity is the new grinding mill department of Dragon Cement Company, Northampton, Pa. An excellent example of compactness, it is designed to be safely operated by *four men*. Rated capacity will be 2,400,000 bbl. of cement annually.

How Dragon Cement Company drives mills efficiently and safely in new 4-man grinding mill department

E-M "INCHER" CONTROL

This E-M-developed control provides quick, safe spotting of grinding mills. It turns mills literally inch-by-inch into desired position, all at the touch of a button. One E-M "Incher" Control can serve several motors, saving time and greatly increasing safety.

● Helping to achieve labor conservation, simplified maintenance, and safety in this new raw and finish grinding mill are five rugged E-M Synchronous Motors rated 1000 hp, 180 rpm, 2300 volts, "unity" power factor. Specifically, here's how these E-M Motors contribute to new standards of economical plant operation:

1. **HIGH EFFICIENCY** conversion of electric power to mechanical power, resulting in minimum electric power cost for operation of mills.
2. **POWER FACTOR CORRECTION** with "unity" power factor helps keep overall plant power factor high, further reducing power costs.
3. **DIRECT CONNECTION** of Motors to mills, thru rigid couplings for simplicity and minimum installation space.
4. **HEAVY-DUTY MILL-TYPE CONSTRUCTION**, including extra-heavy motor frame, high thermal capacity cage windings, dust resistant coil finish, and cool running sleeve-type bearings.

When you combine such motor features and top performance with E-M Hi-Fuse (high voltage, high interrupting capacity) Controls, you get the ultimate in protection as well. Complete safety for personnel and equipment, plus *extra safeguards* against short circuits and abnormal operating conditions. Your nearest E-M sales engineer can give you facts and data. Write the factory for E-M Publication No. 175 on large synchronous motors.

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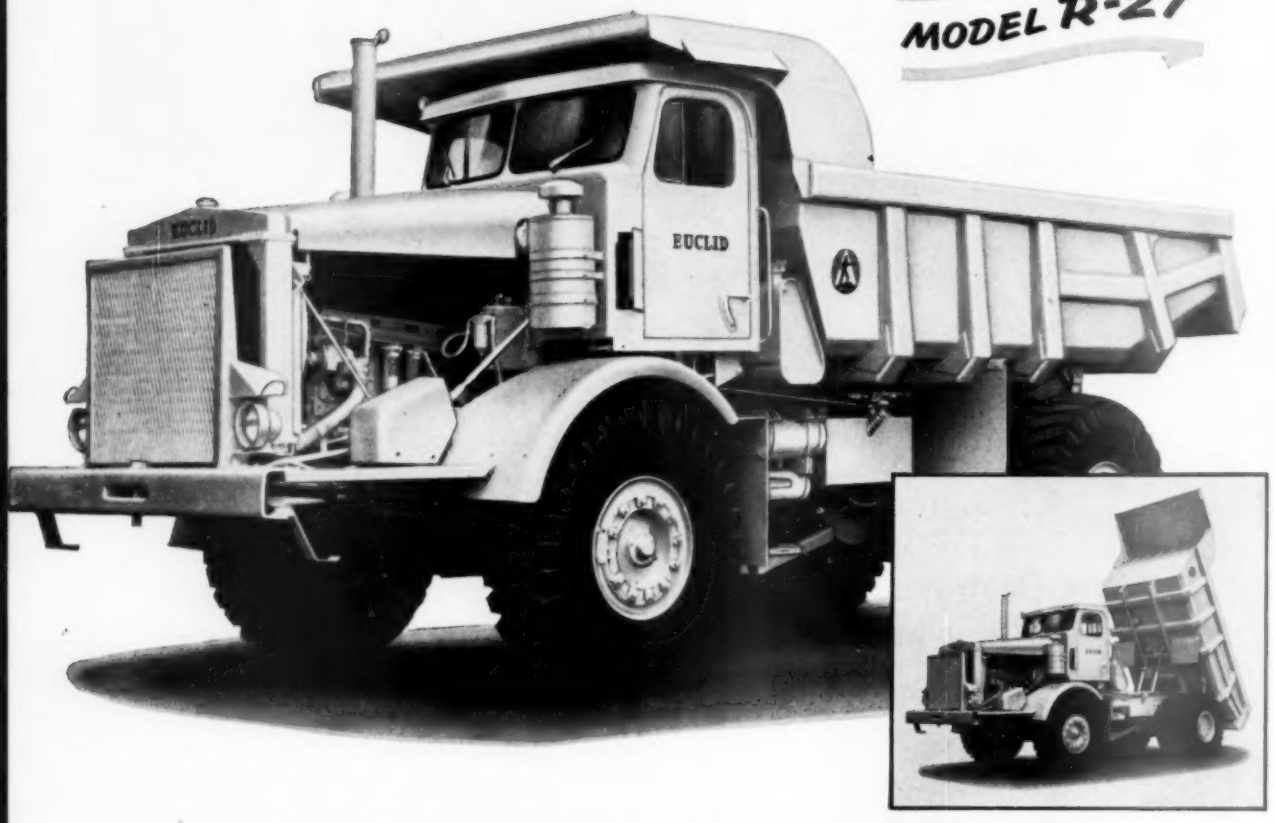
27 ton "EUC"

MODEL R-27



325 or 335 h.p. . . . Torqmatic Drive . . . 18.00 x 25 tires

Model R-27 is a new size in the complete line of Euclid Rear-Dumps—rated payload is 54,000 lbs. This off-highway hauler incorporates the job-proved components which have made Euclid Rear-Dumps the outstanding choice of contractors, mines and quarries.

With either 325 h.p. GM diesel or 335 Cummins engine, the Allison Torqmatic Drive makes maximum use of the power for faster hauling cycles. Converter lock-up in the 4-speed Torqmatic permits 34 mph speed with full payload and efficient performance on long, high speed hauls.

Standard 18.00 x 25 tires on all four wheels assure the traction and load carrying capacity needed for moving 27-ton payloads on tough hauls. Standard body is rated at 18 cu. yds. struck —quarry type body is also available. The R-27 is equipped with oil retarder for safer, more economical braking on jobs with steep down-grades on the loaded haul.

See your Euclid dealer for detailed specifications on this new 27-ton Rear-Dump . . . it's a good example of the advanced design that makes Euclid your best equipment investment.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

REAR-DUMP

It's new...but JOB PROVED!

Big 18.00 x 25 tires on all wheels permit better distribution of payload. Rugged body and frame are designed to withstand loading, hauling and dumping big loads of heavy excavation year in and year out. Quarry body is available for rock work.

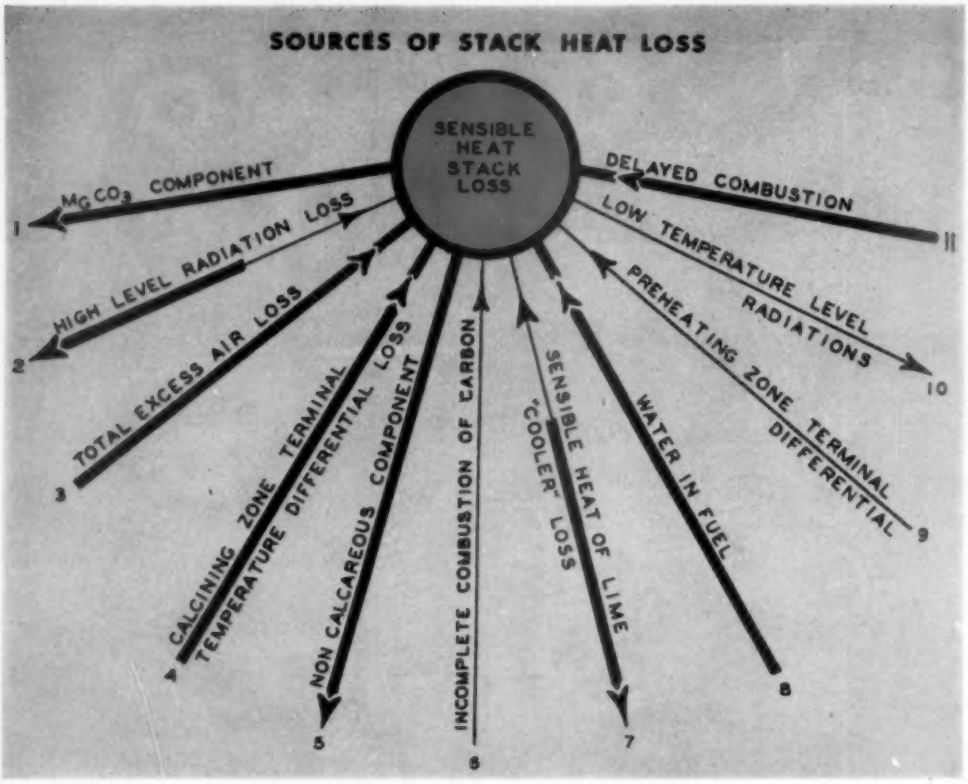
Low loading height and good maneuverability of the R-27 increase the efficiency of loading equipment. Exhaust heated body for work with wet, sticky material is optional. Front and rear springs are thrust-mounted and free floating, with variable spring centers.

The R-27 is equipped with dual steering jacks—one for each wheel—and an independent hydraulic system for steering. Oil retarder—an integral part of the Torqmatic Drive—permits faster safe travel speeds down grade and reduce brake maintenance cost.

Large capacity hydraulic pump and twin hoists have ample power to raise and dump the load fast. Mounting brackets for the two stage double acting hoists are an integral part of frame assembly. Comfortable, well insulated cab is offset for maximum visibility.

A COMPLETE LINE OF REAR-DUMPS—

10, 15, 18, 22, 27, 40 and 50 ton capacities, also semi-trailer models of 12, 22 and 35 ton payload—to fit any job



Arrows show the 11 sources of stack heat loss

Stack heat loss: what causes it?

The author lists eleven contributing factors to the most important source of lime kiln heat loss

*by Victor J. Azbe**

Lime-kiln performance is limited mainly by heat losses out of the cooler, through the kiln walls and up the stack. More specifically, sources of heat loss include:

Drawing of hot lime or non-recuperative cooling of lime.

Radiation and convection from external kiln surfaces.

Latent heat of vaporization of water of the fuel, or water from combustion of hydrogen.

Undeveloped heat from incomplete combustion.

Stack loss of sensible heat.

STACK LOSS is ordinarily the most serious of the five. Many sources contribute to it and only a few minimize it. The accompanying diagram is an aid to the understanding of this kind of heat loss.

Arrows pointing toward the stack indicate an increase in heat loss; away from the stack, a reduction. Heavy lines represent high-level heat of a temperature elevation sufficient to calcine lime. Light lines represent heat below the calcining temperatures and of possible use only for preheating of stone. The word "possible" is used because there is almost always more heat of preheating available than necessary, and loss of such heat may not be so serious as loss of high-temperature-level heat.

Loss of high-level heat is important not only because such heat is capable of calcining, but also because for every loss of high-level heat anywhere, in any manner, about 40 percent of low-level heat will be lost up the stack. The reason is simple: If lime-making heat is wasted, the companion stone-preheating heat will also be wasted. Since lime was not made, stone will be lacking to cool the gases. If hot lime is drawn at the cooler, hotter gases will escape up the stack—and no amount of stone

*Azbe Corporation

Please turn to page 132

Yes! . . . it's ALL STEEL

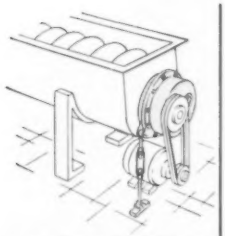
HP RANGE:
½ to 50 hp

RATIOS:
4:1—14:1—24:1 (or 20:1)

OUTPUT SPEED RANGE:
420 to 5 rpm

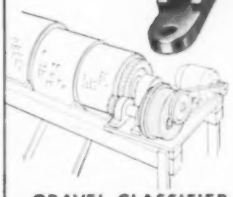
TORQUE RATINGS:
up to 41,000 lb-in
(Consult factory for higher torque capacity)

A FEW TYPICAL APPLICATIONS

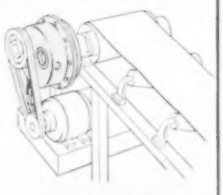


SCREW CONVEYOR

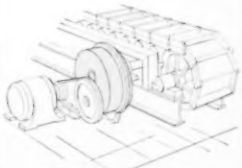
BUCKET ELEVATOR



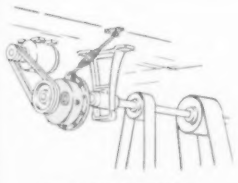
GRAVEL CLASSIFIER



BELT CONVEYOR



APRON FEEDER



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STEEL frame . . . of fabricated plate supports all rotating elements—provides double the ability of iron to maintain vital alignment of revolving elements, even under shock load or external impact.

STEEL housing . . . will not fracture, serves only as protective cover and lubricant reservoir. Therefore, lubricant supply is safeguarded.

STEEL tie-rod and straddle-mounted tie rod brackets . . . are fastened to heavy steel frame by steel bolts in double shear.

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Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

FALK
. . . a good name in industry

Loss of high-level heat is serious since it can calcine rock in kiln, preheat rock entering kiln

Stack losses *continued from page 130*

preheating will correct this. This and other factors governing sources of stack loss we discuss in the following paragraphs, referring to the numbers in the diagram.

1. Stack loss will be less if stone contains $MgCO_3$, because magnesium carbonate has a lower dissociating temperature than calcium carbonate. Dolomitic kilns have a lower exhaust temperature, a lower exhaust loss and a better lime-to-fuel ratio than high-calcium kilns. This is not to say that they are more efficient. Even if fuel ratio is better and production higher, efficiency, if properly evaluated, may not be greater; it may even be less.

2. All high-level radiation loss is high-elevation heat on most rotary kilns, because the kiln is at calcining temperature from end to end. On vertical kilns this is not true. The preheating zone is cooler and heat lost there is heat of low elevation. At "2" on the diagram, the heavy arrow points outward. This represents the high-temperature-level heat loss by radiation. The light arrow points to the stack, representing the low-temperature component, doomed to be lost because due to high-level loss, stone is not available to absorb the low-level loss. The greater the radiation loss, the hotter the stack gases.

3. "Excess air loss" is an unbelievable and serious loss. Three percent excess air would cause a production loss of 30 percent or more in a rotary kiln. In most rotary kilns, excess air leaves the calcining zone at 2,000 deg. F., passing on to the stack. In vertical kilns excess air loss is also serious, but less so than in the rotary kiln. Vertical-kiln gases leave the calcining zone cooler than in the rotary kiln and in smaller amounts. So any given percentage of excess air will represent a lower loss of production.

4. The "calcining zone terminal temperature differential" is the difference between the temperature at which incipient calcination takes place—about 1,500 deg. F.—and the temperature at which the gases escape the calcining zone. Usually this differential is not known, but it is possible to calculate it using exhaust temperature, exhaust-gas analysis and fuel ratio. Because of poor gas-solid contact the calcining zone terminal temperature differential for a rotary kiln will be 500-600 deg. In the vertical kiln, due to very good contact, it will be less than 200 deg. and with small stone, less than 100 deg. All the sensible heat represented by the differential passes on as a loss to the stack at the high specific heat prevailing at the high temperature of the legitimate products of combustion, of excess air and of water vapor.

5. The "non-calcareous component" includes the silica, alumina and limestone that pass through the preheating zone, extracting heat from the gases in their preheating and cooling the gases to the extent of their presence, which would be considerable in the case of hydraulic lime or cement. The heat so extracted would be of low elevation. But if the kiln had an effective cooler, such heat would be recovered through preheating of the air and returned essentially as heat of high elevation, capable of calcining. This mode of heat recovery is much like that of the pebble heater. The action is further enhanced if the non-calcareous component is combined with the lime. An exothermic reaction, generating heat, it is demanded in the case of hydraulic lime and cement; it is undesirable in producing chemical lime. Exothermic reactions aid calcination which draws down more stone to cool the gases.

6. A sensible heat loss also results from the generation of CO. In the process of combustion of carbon to carbon monoxide, incompletely burned CO is produced and heat is generated, but the gaseous products of such combustion are of a relatively low temperature—not much higher than the temperature of the kiln gases as they leave the calcining zone of the rotary kiln. Two kinds of heat are thus lost: undeveloped heat of CO and developed heat that is ineffectual in high-temperature processes. This contributes mainly to the sensible heat stack loss.

7. To prevent the loss of sensible heat from lime, it is not sufficient to cool the lime. Its heat must be recuperatively recovered — that is, returned to the kiln using air of combustion as the vehicle. In the kiln, it must be applied to calcination. This will make possible additional stone flow, which in turn will cool the exhaust gases. If this is not done, there will be a heavy high-level loss from the cooler and a simultaneous low-temperature-level heat loss out the stack.

8. Loss from water in fuel may be considerable because the specific heat of water is twice as high as that of air. Little can be done about it except to reduce the terminal differential by segmentation or, in the case of solid fuel, by drying it with waste heat. However, drying fuel with hot air from the cooler is not drying it with "waste" heat.

9. Preheating-zone terminal temperature differential of rotary kilns can also be reduced by seg-

Please turn to page 145

MORE tons per load
MORE trips per hour
...mean bigger profits for YOU!

Low rear-entry and wide bowl provide easy target for shovel operator... make for fast swing-out of dipper, let operator heap maximum yardage *fast*, with minimum spillage.

At touch of electric dashboard switch, body lifts, swings low behind rear wheels... dumps clean over bank's edge. On soft fills, Rear-Dump can pull out without wheel-spin. Operator "walks" unit free with electric kingpin-steer ...or "humps" it out by varying wheel-base through use of electric hoist-motor and alternate use of front and rear wheel brakes.

The 35-ton (28-yd.) LeTourneau-Westinghouse B Tournapull® Rear-Dump lets you load and haul *big* loads anywhere. And with speeds to 34 mph, this high-production, off-road hauler delivers more material per shift! Here's why:

Greater maneuverability

Big "B" makes continuous 180° turn in space only 35′ wide... in dump position, in just 27′. This unusual maneuverability lets you work in restricted quarters where conventional haulers often cannot go. You spot quicker at the shovel, dump faster, move more loads per day.

In addition, big *load-rated* tires let Rear-Dumps always take the shortest route — over pavement, rocky pit-floors, rough haul-roads, RR tracks, cross-country, or through muck and over soft fills. Time saved adds up to extra trips per shift.

Fast, easy loading

B Rear-Dump's large target (15′4″ long, 10′2″ wide) permits fast, easy loading without spillage. Open rear of body permits quick bucket swing-out, while dipper door is still open. Because it minimizes loading time, big 35-ton Tournapull Rear-Dump gets more loads per hour, earns bigger profits per day.

Dumps fast, clean

Flick of dashboard switch instantly activates point-of-action electric hoist-motor. Body raises quickly to desired angle. At full dump position, trailing edge of bowl is low behind rear wheels... so material cannot roll forward to lodge against wheels, nor pile under rear end. Streamlined body sheds stickiest material readily.

Safe, positive control with big brakes, electrotarder

Multi-disc air brakes on all 4 wheels provide 7,488 sq. in. of braking surface — permit quick, safe control with heaped load, on any grade, in any weather. Electrotarder gives additional *non-wearing* braking action, through resistance on generator. Parking brake, and automatic emergency braking system, are standard.

Interchangeable work units

Behind same basic prime-mover, the new faster-loading 28-yd. Fullpak® scraper, or 30-ton Crane, can be readily interchanged. For a small additional investment, these trailing units can help keep your Tournapull prime-mover profitably busy the year-around. Choice of 335 hp Cummins or 325 hp GM engines. Ask for complete details.

BR-1534-G-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Limestone is blasted from this face and processed in the plant when slag is not needed

Stone and slag-convertible plant makes both

Tennessee plant draws on slag heap from nearby steel mill

THE DUAL-PURPOSE ROCKWOOD SLAG PLANT of Vulcan Materials Co.'s Lambert Bros. division can handle either of two raw materials—air-cooled blast furnace slag or limestone. When the blast furnaces of Tennessee Products and Chemical Corp. are shut down, cutting off Lambert Brothers' source of slag, the plant draws on an outcrop of Newman limestone.

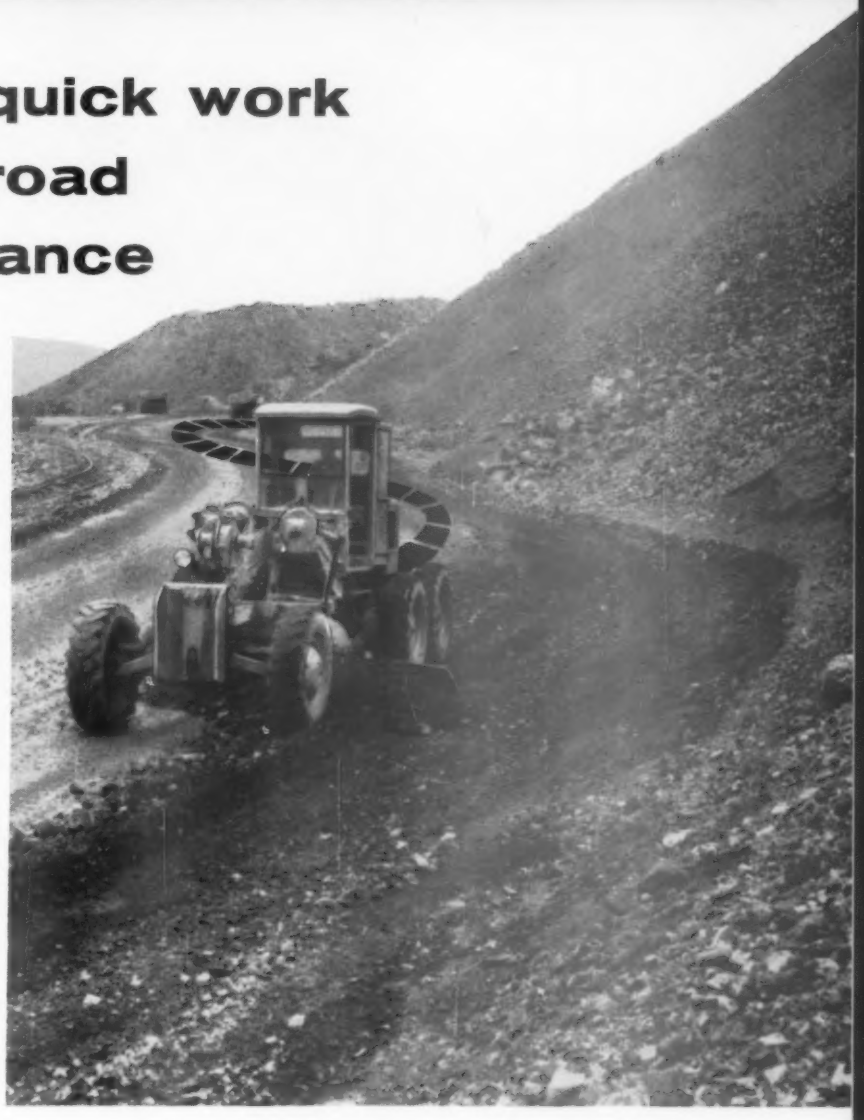
The geology at Rockwood, Tenn., makes this unique arrangement possible. Here, iron-making ingredients outcrop together in the eastern face of the great Cumberland escarpment. A thick seam of coking coal, layers of soft, pure hematite and the fine-grained limestone provide the raw materials for the blast furnaces. When used in a blast furnace the limestone makes a hard, dense air-cooled slag. It also makes strong aggregates.

The market for processed slag is limited only by the availability of the raw slag—drawn off only when the furnaces are in production. The coarser sizes are widely used for filter beds, rail ballast and for sub-base construction of roads and airports. The slag stands up under repeated freezing and thawing cycles with far less degradation than any standard specification. The finer sizes are used for aggregates by concrete products producers in eastern Tennessee and also make ideal aggregates for bituminous construction. Since limestone products can be substituted for slag in many applications, the plant keeps humming along, processing stone whenever raw slag is not available.

The slag "quarry" is a high bank supporting the rail tracks for dumping cinder cars carrying molten slag from the furnaces. The solidified slag at one end of the embankment is excavated with a 1¾-cu. yd. shovel while hot slag cools at another section. The raw slag is hauled to the feeder over a primary crusher by a group of end-dump trucks.

Please turn to page 137

Makes quick work of haul-road maintenance



Powerful L-W Adams 660 — at large open-pit mine in Arizona — patrols busy haul roads 24 hr a day, 6 days a week. Grader goes wherever needed (at speeds to 26 mph) to fill ruts, level washboard, clear debris dropped by overloaded haulers and improve drainage.

You know from experience that using the *right* tool on any job completes the work faster and easier. The same holds true when maintaining your haul roads, pit floor, dump areas around crusher, and stockpiles, or waste dump. Use a heavy-duty L-W Adams† grader for these maintenance assignments. You'll find you can complete this work *faster* and *at lower cost.*

Greater work range

All LeTourneau-Westinghouse 80, 115, 123, and 160 hp Adams graders have constant-mesh transmission as standard, with 8 forward and 4 reverse speeds. In addition, 3 optional creeper speeds provide extra lugging power for turning up rocky subsurfaces and for greater grading accuracy. Choice of 15 gear ratios give you the balance of power and speed to handle every grading job . . . in any material . . . at top efficiency.

Smooth, accurate control

Adams' blade mechanism is firmly mounted on a heavy-duty circle for chatter-free operation. Strong T-shaped drawbar gives L-W grader firm circle support for accurate blading in any material.

Blade positioning is fast . . . it swings maximum arc from deep ditch-cut to high bank-cut in less than a minute. Moldboard turns 360° — clockwise or counter clockwise — provides quick change from any forward work position, to desired angle for reverse ditching and grading.

Low operating costs

All gears operate on anti-friction bearings — for less wear, easier operation. Automatic braking on transmission, when hydraulic brakes are applied to wheels, gives safer operation and less maintenance. And because L-W power-control clutches shift on ball bearings, you have easier, smoother, safer controls . . . assuring accuracy, speed, and performance with minimum upkeep.

Keeps busy all year

Between regular assignments, your LeTourneau-Westinghouse grader need not sit idle. With available attachments, such as Jebco Elegrader, bulldozer blade, scarifier, snow plow and wing, you can keep this grader busy on your property the year round. Also, grader's high travel speeds (to 26 mph) permit the profitable handling of jobs for adjoining pits. There are 7 Adams models — 60 to 190 hp. Your choice of GM or Cummins engines on 6 larger models. 190 and 135-hp POWER-*Flow*® models have torque-converter drive . . . will do more work faster than any other graders on the market. Call or write for a demonstration today!

†Trademark G-1874-MQ-1

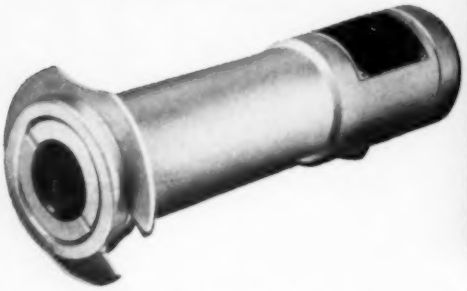
LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

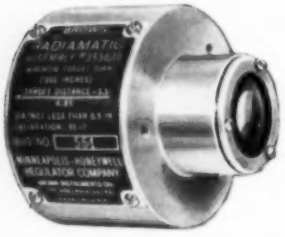
Where quality is a habit

General Purpose *Radiamatic* Unit—for applications in the temperature range from 200 to 4000 F. Available in low, intermediate and high-range and high-speed models.

Measure "problem" temperatures with a *Radiamatic* temperature detector



Small Target *Radiamatic* Unit—for temperature range from 1700 to 7000 F. Available in five models, depending on size of target and temperature requirements.



Miniature *Radiamatic* Unit—for range from 200 to 3200 F. For use where space is limited and small targets must be observed at short distances.

USE *Radiamatic* detectors to measure the temperature of moving objects without physical contact . . . or for representative temperatures over large areas . . . or where abrasion, vibration, shock or corrosive atmospheres exist. *Radiamatic* temperature detectors are used extensively where thermocouples can't be used.

These detectors operate faster than thermocouples. You can easily interchange various types of *Radiamatic* units in your installation to meet changing requirements. They're reliable, maintenance-free production aids that give long service in any application. *Radiamatic* detectors have ambient temperature compensation to 350 F.

There's a complete line of *Radiamatic* accessories—sighting and target tubes, mounting frames, supports, air and water cooled fittings —where necessary—for varied installation needs. And there's a complete line of Honeywell indicators, recorders and controllers for use with these units.

Get complete details from your nearby Honeywell field engineer. He's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Aves., Phila. 44, Pa.

Honeywell

H HONEYWELL First in Control

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Blast-furnace slag from bank in distance is shoveled into trucks for delivery to primary processing end of plant, foreground

Stone or slag *continued from page 134*

The primary crushing and screening equipment is used for the first steps in crushing limestone as well as slag.

The limestone ledge may be as much as 500 ft. deep where it outcrops on the steep face of Walden Ridge, a mile from the screening plant. The four trucks which haul slag are also used to bring limestone to the crusher. Crushing capacity is about 1,500 tpd. for the hard limestone, compared with about 2,000 tpd. for the softer and lighter air-cooled slag.

Dust control at this plant is important, and every point which would generate dust is fitted with water sprays which throw a fine mist. This does an excellent job of suppressing dust without wetting the material in the process. Any complaints about windblown dust are handled personally by Wesley Ogle, plant superintendent. If wind or weather conditions make dust particularly objectionable, the plant is shut down.

At the apron feeder above the 25 x 40 jaw crusher, the operator adjusts the volume of water to control the amount of dust thrown up by dumping and crushing. An inclined belt conveyor takes the minus 3-in. material from the crusher to a two-deck vibrating screen whose top deck, normally a 3-in. cloth, scalps off oversize. The lower deck has a split-deck arrangement to take out part of the minus 1-in. stone or slag from minus 2-in. product.

Oversize from the top deck is chuted to a secondary jaw crusher, dropped to an inclined belt conveyor and returned to the flow of raw material from the primary crusher. The 3 x 2-in. oversize from the second deck of the scalping screen can be chuted to a secondary double roll crusher and put into the recycle system, or it can be retained in storage bins for truck shipment.

The double-deck screen gives a great deal of flexibility to the system of making coarse sizes of stone or slag. Filter stone or slag is usually 4 x 2 in., rail ballast 2 x 1 in. and coarse slag aggregate for pugmill batching $1\frac{1}{2}$ x $\frac{3}{8}$ in.

Slag and limestone take different paths from the storage bins under the scalping screen. Minus 1-in. slag continues in a straight line flow while limestone is diverted to a 5,000-ton surge pile which serves the limestone crushing and screening system. With this arrangement it is possible to process the stone at the same time slag is put through the primary crusher and scalping system.

A long inclined belt conveyor taps the side of the primary storage bin to take the minus 1-in. coarse slag to a pair of double-deck horizontal vibrating screens. These screens are mounted over three open-side storage bins, with reclaim by belt conveyor for rail shipment or access for front end loader for truck shipment. Normally, about 18 cars a day are sent by rail.

Please turn to page 138

Overall plant view shows process flow, left to right. Steel plant is left background

Stone or slag *continued from page 137*

Dumping is dust-controlled with spray, upper right

The double-deck screens make three sizes of slag aggregates, usually 1½ x ¾, ¾ x ⅜ and ⅜ x 0. Here again, the screen cloths can be changed to make whatever size specification is needed.

Limestone processing starts at the primary storage bin where the minus 2-in. stone or other coarse stone is taken to the surge pile. Material taken from the surge pile is conveyed to a three-deck vibrating screen above two shipping bins served by the rail shipping belt conveyor. In this way coarse stone can be shipped in gondolas.

The vibrating screen makes four sizes of stone —plus ¾ in. which is stored or recycled through a hammermill to make fine material; ¾ x ½ in.; ½ x ⅜ in. and minus ⅜-in. sand. The sand is often reprocessed in an air separator to take out the minus 100-mesh fines, which are then available for agricultural limestone.

A group of three 50-ton steel storage bins for truck shipment gives the Rockwood plant plenty of storage flexibility. A vibrating screen above these bins insures the size accuracy of the stored aggregates. Rejects or oversize are stored in a surge hopper above a double roll crusher which discharges to the flow of stone on the reclaim belt conveyor from the surge pile.

These steel bins are the first installment in a program to completely redesign and re-equip this slag and stone processing plant. Wooden bins and screening towers will be replaced, both to provide more storage capacity and to shorten the distance the material must travel.

END

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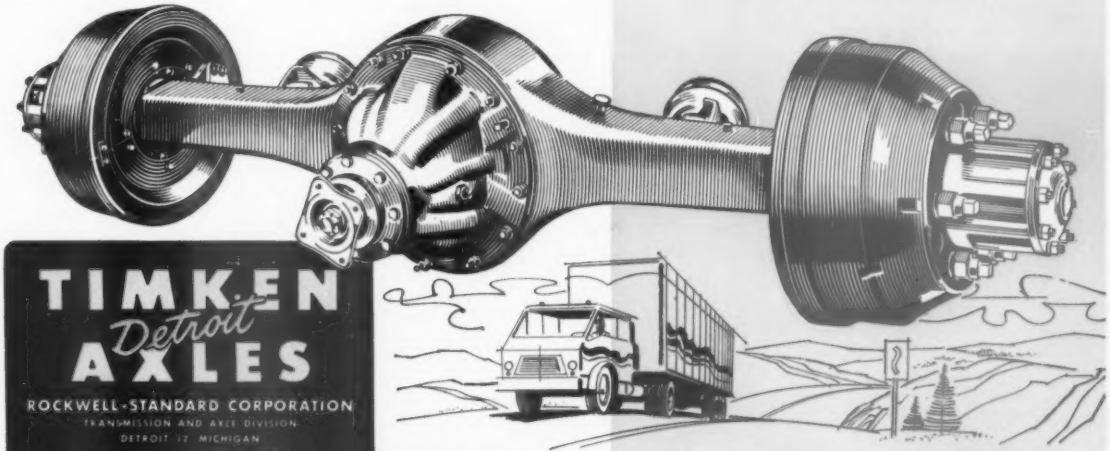

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Shaft kiln *continued from page 102*

was torn up. The same observation had been made when ground coal was used with conventional grates. Good insulation is less complicated.

The size of coal and pellets is important because it determines the reactivity and length of the burning zone. The amount of the fuel also exerts a minor influence. At many older installations, these factors are not fully under control. The fuel, especially, has no constant properties. It is rarely classified for uniform size and the heat value varies considerably.

Decisive progress has been made by intergrinding the fuel with the raw mix. Finely powdered coal reacts differently from coarse coal. Coarse coal requires oxygen for reaction. Sometimes oxygen is not present in the upper parts of the kiln and combustion can only be completed in the lower part. Ground coal, however, can react with the raw mix even without oxygen, according to Hauenschild:

$$CaCO_3 + C = CaO + 2\,CO \text{ (simplified)}$$

A deficiency of air does not result in a drawing down of the fire zone. The fire stays short and surplus coal in air deficiency zones will disappear as CO in the upper part of the kiln.

With pulverized coal, the length of the fire depends mainly on the pellet size, so it can be easily controlled and kept uniform. Such a short fire in the upper part of the kiln does not produce dense clinker. The material stays porous and the pellets do not fuse. They stay loose or are only slightly fritted together. It is easy now to adapt the fire length to the cone-shaped lining just by changing the size of the pellets. Proper action of the cone can be maintained.

With powdered coal, the clinker does not shrink as much as usual. Burnt pellets have a shell-like structure reminiscent of a rosebud. The shape of the cone need not be tapered so much and it is easier to have even air distribution throughout the kiln area.

It can be easily understood now that the improvement of quality is connected with better heat economy. With a properly shaped cone, good insulation, ground coal and a new grate a figure of 860 kcal. per kilogram of clinker (582,000 Btu. per bbl.) was obtained, an improvement of 200 kcal. over conventional grate, medium insulation and well graded (0-3 mm.) coal. This fuel consumption is considerably less than the typical rotary kiln.

This may not be the last word in development. The flue gas still contains some CO. The so-called shell process might further improve these figures.

END

Rinker Rock *continued from page 87*

crushed rock sizes; the second contains the washed gravel sizes and another sand stockpile. Under each row is a reclaiming tunnel in which a reclaim belt operates. Near the "out" portal of each parallel tunnel are a rinse screen and truck load-out facilities. The rinse screen can also serve a system of two belt conveyors, operating at right angles to the tunnel belts and delivering aggregates to the adjacent ready-mix plant of Concrete Sales, Inc., an affiliated company.

Rejects from the first dry-screening tower are conveyed to the second tower, where three more sizes of crushed rock—1½, ¾ and ⅜ in.—are produced and stockpiled.

Material for wet processing is diverted from the flow at the vibrating grizzly-feeder, where through material is belt-conveyed to the first tower on the washed-gravel side. This tower contains a three-deck, wet, 4 x 14-ft. vibrating screen and a six-spigot, 20-ft. water scalper. Oversize from the top deck of the screen is conveyed to the belt serving the secondary crusher on the dry side. The third deck produces ¼-in. washed gravel, which is belt-conveyed to the stockpile. The remaining four sizes of washed gravel—1½, 1, ½ and ⅜—are produced at the second screening tower on the wet side.

Through material from the first wet screen falls to the water scalper below. The scalper is equipped with two flumes. One collects the blend from the six spigots; the second, any unwanted sand sizes and waste water. The waste water is carried to the disposal area.

Sand from the water scalper is dewatered in a 36-in.-diam. spiral. The spiral's product is conveyed either to the masons sand stockpile or to the concrete sand pile.

Gravity gates are used for feeding the reclaim belts except under the sand piles, where a belt feeder is used. The outer support for each set of stockpile belt conveyors is an elevated steel structure above and parallel to the reclaiming tunnel.

END

MAJOR EQUIPMENT USED BY RINKER ROCK CO.

Dragline, 2 cu. yd., No. 705	American Hoist & Derrick Co.
Pit trucks (2), 12 cu. yd., rear-dump	Peterbilt Motors Co.
Primary crusher, 18 x 36 in.	Iowa Mfg. Co.
Vibrating screens (4), three-deck 4 x 14 ft. (1), 4 x 12 ft. (3)	Iowa Mfg. Co.
Secondary crusher, 4¼ ft., fine bowl, Symons cone	Nordberg Mfg. Co.
Primary feeder-grizzly	Syntron Co.
Water scalper, 20 ft., 6-spigot, 2-flume	Eagle Iron Works
Sand dewatering spiral, 36 in.	Eagle Iron Works
Fresh water pump, 75 hp.	Peerless Pump Div., Food Machinery & Chemical Corp.
Fresh water booster pump, 50 hp.	Peerless Pump Div., Food Machinery & Chemical Corp.
Front-end loader	Frank G. Hough Co.
Conveyor belts (21)	Quaker Rubber Corp.
Conveyors, idlers, etc.	Iowa Manufacturing Co.
Tractor, D-6	Caterpillar Tractor Co.

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21 years of efficient, economical classification for a large sand and gravel company. The photo shows 2 of 3 Akins Classifiers installed in this plant in 1937. Proved performance resulted in purchase of 3 additional Akins.

*Reduced operating costs.

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Coal waste *continued from page 95*

The primary mill has 30 x 30-in. rolls at 100 rpm. Spaced 2 in. apart, these rolls easily reduce the cake to a size that can be handled by the 36-in. diam. x 30-in. wide secondary rolls. These are set from ½ to ¾ in. apart and run at 125 rpm. Since the crushing plant can handle twice the production of the sintering machine, it is operated on a single shift for every two shifts the other is operated. An inclined conveyor carries the crushed aggregate to screens that separate it into the three grades, each of which is stored in its own bunker.

The Derby plant is operated by a team of six or seven men, and can produce more than 300 cu. yd. of sinter cake in a 9-hr. shift. It is a very flexible plant in that it can be stopped and restarted as frequently as desired without risk to the machine or to the workers. These shutdowns do not waste fuel, because the oil burners can be extinguished and relighted quite easily. When the belt is stationary for a short period, however, the fans must continue to run until sintering of material on the bed is complete. Otherwise, the cake would be spoiled.

Use as aggregate. Since its introduction into England, Aglite has proved a boon in concrete and masonry production. It answers a long-felt requirement for a high-quality, load-bearing lightweight block with better all-round characteristics, particularly lower shrinkage and moisture movement than had been generally available. A number of producers are now making the block to specification in a wide range of solid, cavity and hollow units in standard sizes. It is being recommended as loose fill insulation and it is likely also that a high-quality plaster aggregate can be developed from it because of better thermal and sound characteristics. In various projects it has been demonstrated as suitable for infiller block in patent systems and for lightweight insulating screeds, and it is equally adaptable for refractory applications. The future of Aglite in England seems assured.

END

Front loader *continued from page 112*

the building and can go either to a surge bin ahead of a pulverizer or to 60-ton tanks for seasoning prior to milling. The mill is equipped with a double separator that uses integral air separation. Prior to bagging or bulk loading, the hydrate is stored in 20-ton bins. The hydrate is bagged by a three-spout packer or it can go into railroad cars or bulk storage.

The water table at the plant site is only 4 ft.

Please turn to page 145

Another Exacting Job for the RAYMOND VERTICAL MILL

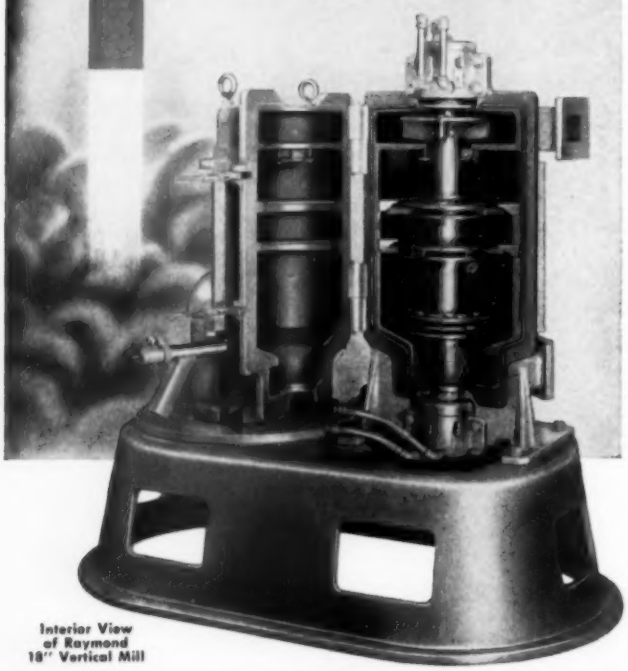
Now working with industry on today's newest developments, the Raymond Vertical Mill is serving manufacturers in the production of solid rocket propellants.

Since this unit is designed for pulverizing to extreme fineness and uniformity, it does an excellent job in grinding the ammonium nitrate and ammonium perchlorate oxidizers to the required specifications.

Outstanding features of the Vertical Mill are:—

1. Ability to meet exacting particle size distribution requirements for proper burning rate and molding qualities.
2. Easily adjusted for a wide range of product fineness.
3. Quick and complete accessibility for adjustments, clean-out or maintenance.
4. Trouble-free operation with no over-heating of product.
5. Automatic and dust-free operation.
6. Compact layout and flexible installation.

One company has already been using the Raymond Vertical Mill for over two years, and has obtained excellent results on ammonium nitrate and perchlorate. Raymond mills have also been used for many years on the potassium chlorate, perchlorate, and nitrate oxidizers.



Interior View of Raymond 18" Vertical Mill

Write for data on special applications of the Raymond VERTICAL MILL, and ask for Bulletin No. 78

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Front loader *continued from page 143*

below the surface so all structures except the kiln supports are on floating foundations. For the same reason, the 700-ft. reclaiming tunnel beneath the stone-storage pile is above ground. A double-spur track parallels the mill building and provides ample car capacity and loading facilities. Future plans call for the installation of carbon dioxide recovery equipment. END

MAJOR EQUIPMENT AT CHEMICAL LIME CO., BAKER, ORE.

In the quarry:	
Loader, 8-ton-capacity Scoopmobile	Mixermobile Mfrs.
Apron feeder, 42 in. x 15 ft.	Lippmann Engineering Works
Jaw crusher, 30 x 42 in.	Pioneer Engineering, Div. of Poor & Co.
Apron feeder	Pioneer Engineering, Div. of Poor & Co.
Screen, two-deck, dry, 5 x 10 ft.	W. S. Tyler Co.
Crusher, 3-ft. TY	Traylor Engineering & Mfg. Co.
Screen, three-deck, dry, 4 x 10 ft.	El-Jay Mfg. Co.
Wagon drill	Worthington Corp.
Truck-trailer units, 26-ton	International Harvester Co.
In the plant:	
Kilns, 7½ x 150 ft. (2)	Vulcan Iron Works
Kiln feeders	Syntron Co.
Kiln coolers, 7 x 60 ft.	Vulcan Iron Works
Kiln drives	
Motor, 40 hp.	The Louis Allis Co.
Variable speed drive	U. S. Electrical Motors, Inc.
Gear reduction units	Western Gear Works
Kiln fans	American Air Filter Co., Inc.
Kiln dust collectors (4)	American Air Filter Co., Inc.
Lime conveyor, coil-mounted, natural frequency	Link-Belt Co.
Screen, three-deck	El-Jay Mfg. Co.
Lime pulverizer, suspended, 4-roller	Williams Patent Pulverizer & Crusher Co.
Lime separators	Williams Patent Pulverizer & Crusher Co.
Packers	St. Regis Paper Co.
Bin indicators	The Bin-dicator Co.
Swing-hammer mill	Sturtevant Mill Co.
Hydrator	Kritzer Co.
Separators	Combustion Engineering, Inc.
Pulverizer	Raymond Div.
Belt conveyors, idlers and tripper	Chain Belt Co.

Stack losses *continued from page 132*

mentation and stack loss will be materially lessened. In vertical kilns, terminal differential may be reduced through improved fuel distribution, improved stone size uniformity and stone size reduction and by increasing the frequency of lime drawing and stone charging.

10. Low-temperature-level radiations from the rear of rotary kilns or upper sections of vertical kilns would cool the stack gases to an extent, while radiations from the hot kiln sections would heat them. In either case, it would be better to operate the kilns hot for a higher production; although radiation loss would be greater, proportionately it would be less. "High production" here means 30 cu. ft. per ton or less, rather than 50, 60 or more.

11. Delayed combustion, causing heat to be generated too late in the kiln, definitely heats the stack gases. It is due to improper primary and secondary air-to-fuel proportioning, improper burner mixing and also improper flame velocity and direction. END

ROCKY'S NOTES

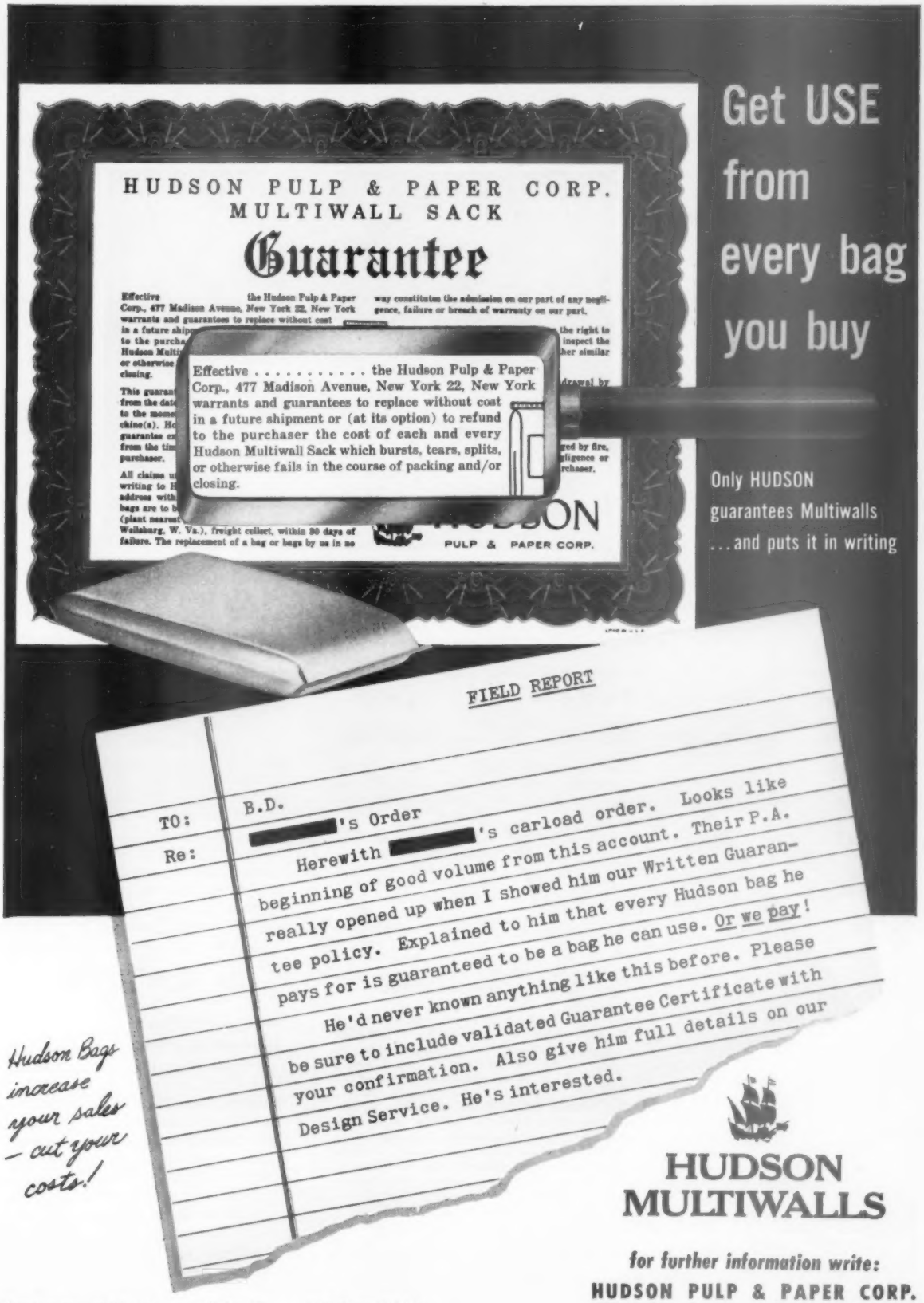
(Continued from page 20)

Dr. Bates said that in many countries he has visited, the natives simply have not been able to grasp the meaning of the organization and character of ASTM. The idea of a free voluntary society writing specifications and tests for materials that public authorities purchase and use, is to them inconceivable. In most countries these are government functions exclusively. When he explains that government bureaus and government scientific employes belong to ASTM and are most acceptable members, but have no more authority than any other member, the people of other countries cannot understand. Most of us probably have never thought of ASTM as such a unique and typically American institution, but upon reflection we can appreciate Dr. Bates' views.

Progress is made, but slowly. With this in mind we can also appreciate why faster progress is not made in changing specifications or tests to something some may consider much better. Old-timers often complain, at least half seriously, that they are still debating the same issues they were 30 or 40 years ago. It is true in some instances, but in the course of these discussions new points, or new information, are developed from time to time; and constant repetition of many established facts makes for expert knowledge of the subject, even for those who may not have studied or had experience in that particular line. Progress is made, as anyone who reviews or summarizes developments over a period of time can readily determine. And in this respect ASTM exemplifies a living democracy too.

We have always looked upon our own membership and attendance at such meetings, as we refer to above, as continuation of our education in the sciences which find application in the production and use of materials like cement, lime, gypsum, concrete and concrete aggregates. But it has done more than that. It has supplied a continuing course in the liberal arts of humanities and pyschology. For at these meetings, just as in the assemblies of ancient Greece and modern parliaments of democratic government, one sees the working of human minds, and practice of the elements of leadership, in action. The only difference between such meetings of scientific men and of politicians appears to be the superior intelligence of men of science and their clearer conception of the common good, and

(Continued on page 148)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Effective ..... the Hudson Pulp & Paper Corp., 477 Madison Avenue, New York 22, New York warrants and guarantees to replace without cost in a future shipment or (at its option) to refund to the purchaser the cost of each and every Hudson Multiwall Sack which bursts, tears, splits, or otherwise fails in the course of packing and/or closing.
PULP & PAPER CORP.
Get USE from every bag you buy
Only HUDSON guarantees Multiwalls ...and puts it in writing
FIELD REPORT
TO: B.D.
Re: [redacted]'s Order
Herewith [redacted]'s carload order. Looks like beginning of good volume from this account. Their P.A. really opened up when I showed him our Written Guarantee policy. Explained to him that every Hudson bag he pays for is guaranteed to be a bag he can use. Or we pay!
He'd never known anything like this before. Please be sure to include validated Guarantee Certificate with your confirmation. Also give him full details on our Design Service. He's interested.
Hudson Bags increase your sales — cut your costs!
HUDSON MULTIWALLS
for further information write:
HUDSON PULP & PAPER CORP.
477 Madison Avenue • New York 22, N. Y.
Enter 1106 on Reader Card
Plants at Pine Bluff, Ark. • Palatka, Fla. • Wellsburg, W. Va.

ROCKY'S NOTES

(Continued from page 146)

hence their greater willingness to compromise their selfish objectives for the good of all.

ASTM membership is worthwhile. With these thoughts in mind, the reader can understand why we consider membership in ASTM by any producer in our industries who has some technical knowledge of his product, or has up-and-coming young employes who seek to keep up their college learning, a very good investment. There is not membership available on these committees to all new members, for in order to be actual working committees membership on them must necessarily be limited. Also, the membership must not be overbalanced with members who represent only producer interests. However, any member of the society may attend these committee meetings as a visitor, and at most such meetings the visitor is extended the same privilege of discussion as a member of the committee.

At all times the new member, or any member, has ready access to men of mature experience and knowledge in many special lines of these subjects, and with whom he is always free to consult. Scientists have few secrets among themselves about their work and their special knowledge. That is what is meant by the familiar expression: "Scientists speak a common language." Members of these technical committees seldom give up their memberships. Chemists and laboratory technicians graduate in their companies into vice presidents and managers, but they keep their ASTM contacts not merely to continue their education, but because they have made friends with men of like-mindedness, whom they delight to visit with at least two or three times a year.

END

New phosphate division organized

INTERNATIONAL MINERALS & CHEMICAL CORP. has put into effect a consolidation program which will streamline its organization and "effect greater efficiency of operation, improved customer service and a stronger marketing position." The move, announced by President T. M. Ware, brings the phosphate chemicals and phosphate minerals divisions into a single phosphate unit and consolidates research and engineering into one staff division which will handle research, engineering and development.

Digging iron ore on the Mesabi Range near Aurora, Minnesota.

MARION 151-M—Power For Unmatched Digging in Mines and Quarries

A Marion 151-M in action is a familiar sight in many parts of the iron range, in copper mines, coal pits and quarries throughout the world. This 7-yard machine is ruggedly built throughout with ample power for continuous, high-speed production. It is readily convertible to dragline service with boom lengths from 80′ to 120′ and buckets from 4 to 8 yards.

A 40-ton Marion 43-M truck crane loads 69,000 pounds at 13 feet. Such standard features as a torque converter, Marionair Control, power raising and lowering of the gantry and ballast give the operator big advantages. The strong, highly mobile carrier provides maximum maneuverability during travel and on the job.

Consult Marion Mining Specialists for lower costs on your property.

MARION

MARION POWER SHOVEL COMPANY—MARION, OHIO, U. S. A.

A Division of Universal Marion Corporation

NEW LITERATURE

Truck line

FORD MOTOR CO. has issued folders describing its 1959 trucks, which include pickups, dump units and others in a line of 371 models. Four-wheel-drive pickups are new for 1959, with other pickup models ranging in payload capacity from ¾ to 1¾ tons. The firm's heavy-duty trucks range up to 277-hp. models with load capacity of 17 tons.

Enter 500 on Reader Card

Liquid cyclones

BATTELLE MEMORIAL INSTITUTE has released an enlarged and revised free bibliography on the liquid-solid cyclone. It lists 243 articles on the subject published between 1939 and 1957, with a few 1958 entries. The articles consider theory and design of the equipment, and its use in the mineral processing and other industries.

Enter 501 on Reader Card

Oscillating conveyors

LINK-BELT CO. has released 24-page Booklet 2744 on its oscillating conveyors with capacities to 350 tph. This type of conveyor is said to keep material moving in an even flow off the discharge end of the unit, regardless of surges in feed. The oscillating conveyors, made in three types, are said to be clean, low-maintenance, compact material movers.

Enter 502 on Reader Card

Large portable compressor

LE ROI DIVISION of Westinghouse Air Brake Co. has issued Data Sheet P-114, giving specifications of a unit it describes as the world's largest portable rotary air compressor. The unit has two engines with a total of 398 hp., and has a 1,200-cfm. capacity.

Enter 503 on Reader Card

Reduced voltage starters

ALLIS-CHALMERS MFG. CO. has published Bulletin 14B8192 on its automatic reduced voltage starters. They are engineered for large conveyors, hammermills, centrifugal compressors, pumps, large fans, motor-generator sets and other applications. The 12-page booklet states that this type of starter is often desired where slow acceleration is desired, or where a serious line disturbance might result.

Enter 504 on Reader Card

Motorized gear drives

THE LOUIS ALLIS CO. has published Bulletin 2350 on its new line of gear reducers for motor ratings of 1 to 75 hp. and reduction ratios up to 1,487 to 1. The new line is said to permit reduced motor inventories because of standardization, and to permit rapid motor changes. The drives are powered by motors of any type and can be mounted in any position.

Enter 505 on Reader Card

Horizontal-grate cooler

FULLER CO. has issued Bulletin CO-6 describing its new horizontal grate cooler for use in cooling materials from rotary kilns and sintering machines. Improved control of secondary air, need for fewer refractories, shorter installation time and compact design are claimed for the unit.

Enter 506 on Reader Card

Roller bearing catalog

THE TORRINGTON CO. has made available Catalog 258 covering five standard series of self-aligning spherical roller bearings, with bore sizes ranging from 40 mm. up through 1,060 mm. Complete dimension tables, load ratings expressed as basic dynamic capacity, and line graphs showing modifying speed and life factors help the designer to choose the proper bearing for each application.

Enter 507 on Reader Card

Steel and aluminum data

JOSEPH T. RYERSON & SON, INC. has published a new edition of its 256-page, pocket-sized data book. Principal change from earlier editions is the inclusion of a section on aluminum characteristics and mechanical properties. The steel section lists ASTM standards, manufacturing tolerances, weights, safe loads and steel properties as well.

Enter 508 on Reader Card

Bucket elevators

VAN GORP MFG., INC., has available a leaflet describing its line of bucket elevators with capacities ranging up to 158 tons per hour, depending on weight of material. The buckets are designed for high speed, close spacing and perfect discharge, the company states.

Enter 509 on Reader Card

Wire rope

MACWHYTE WIRE ROPE CO. has available a 190-page pocket-sized handbook on the correct handling, design and use of wire rope. The thumb-indexed handbook describes such things as rope capacity, correct spooling and inspection procedures.

Enter 510 on Reader Card

Off-highway trucks

LETOURNEAU-WESTINGHOUSE CO. has issued a 24-page booklet describing its Haulpak off-highway trucks with capacities of from 22 to 32 tons. It describes the use of air suspension, and notes the attention given in the trucks' design to high-cycle speed and sturdy construction.

Enter 511 on Reader Card

Gears

ILLINOIS GEAR & MACHINE CO. has issued a 12-page brochure on its products and production facilities. Bulletin 26 IG describes the firm's capabilities in making bevel gears, screws, gear racks and other types.

Enter 512 on Reader Card

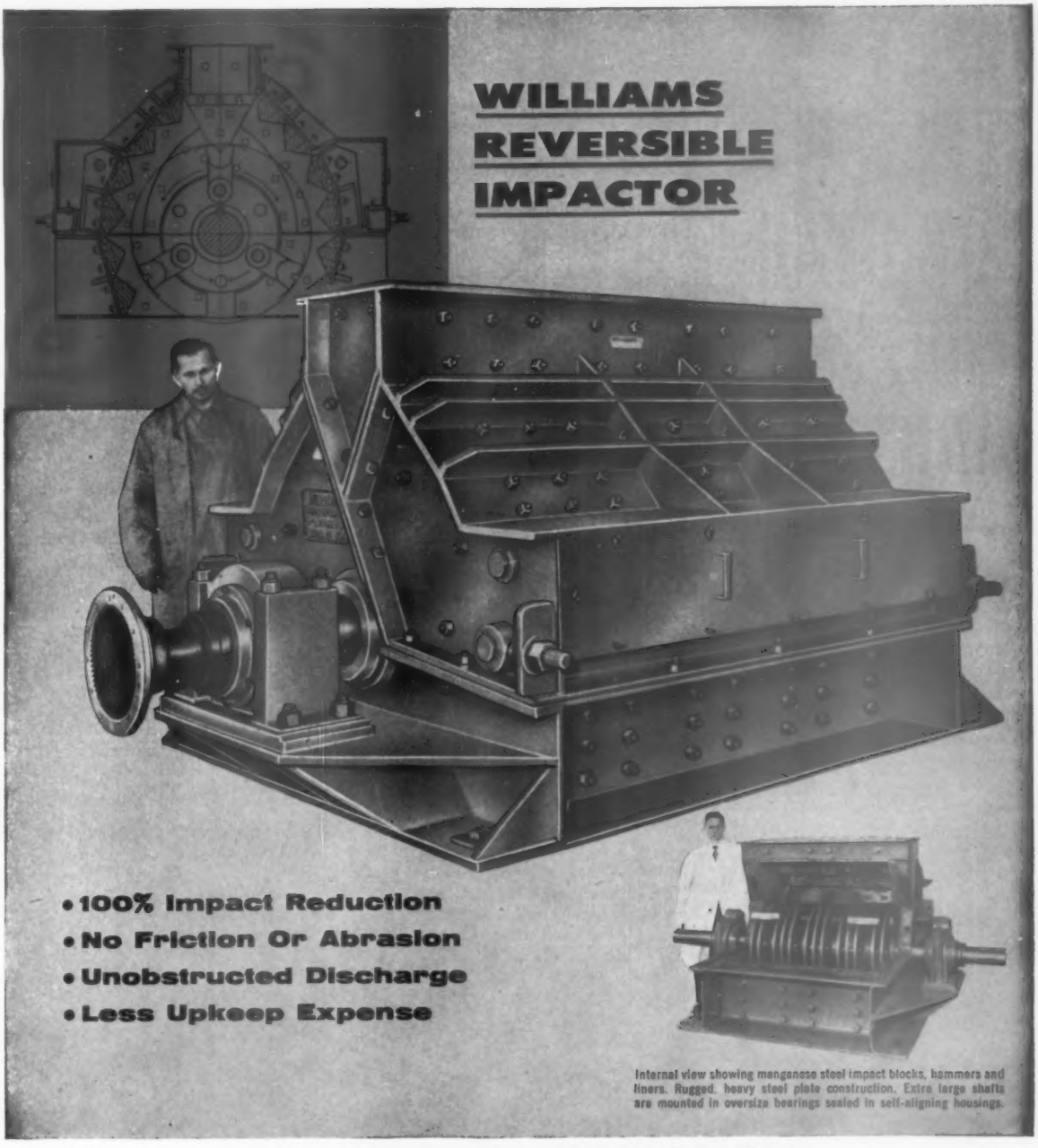
Materials handling

NATIONAL SAFETY COUNCIL has released a pamphlet entitled "Easy Does It" providing tips on how to pile and lift, plus rules for driving power trucks. The pamphlet is considered the byword where industrial materials handling is concerned. It reports that one out of every four work injuries results from moving objects, and the answers to "What can happen if you handle materials incorrectly?" are illustrated and described.

Enter 513 on Reader Card

(Continued on page 152)

WILLIAMS REVERSIBLE IMPACTOR



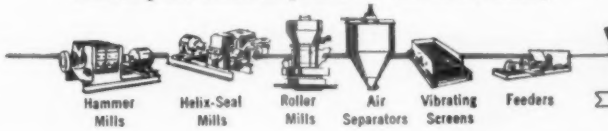
- 100% Impact Reduction
- No Friction Or Abrasion
- Unobstructed Discharge
- Less Upkeep Expense

Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

Unequalled For Secondary Grinding

Reduces limestone and material of similar hardness to 1½", ¾" or smaller. Properly adjusted, the Williams Impactor makes excellent material with the proper percentage of fines for road base course. Unusually low upkeep expense as reduction is 100% by impact. Material is fed to enter between the hammers and is thrown against the impact blocks setting up a repeated ricochet action which accomplishes the reduction. Adjustable impact blocks adjust for wear. A reversing switch on motor permits rotating hammers in either direction, to the left today and to the right tomorrow, thereby giving double hammer life. No grates are used. Entire bottom is open permitting unobstructed discharge of crushed material and less wear and tear. A size for every job. Let us tell you about one for your use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 ST. LOUIS AVE. St. Louis 6, Mo.



WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World

Enter 1075 on Reader Card

NEW LITERATURE

(Continued from page 150)

Motorized head pulleys

GEORG VON OPEL CORP. has issued data sheets on West German-made, Bauer motorized head pulleys for belt conveyors requiring ¼ to 15 hp. A totally enclosed motor (located within the head pulley) and the absence of V-belts and exterior-mounted motor are said to cut space requirements and maintenance, and give a safer design.

Enter 525 on Reader Card

Rear-dump hauler

EASTON CAR & CONSTRUCTION CO. is distributing Bulletin 1-A8 on the new Euclid-Easton 22-ton rear dump unit. The bulletin gives design features and specifications.

Enter 526 on Reader Card

Medium range generator

ELECTRIC MACHINERY MFG. CO. has released Data Sheet 2100-PRD-251 on its line of high-speed, synchronous generators. Available from 50 through 187 kva., 60 or 50 cycles, the machines are suitable for engine connection (single bearing) or motor driven (two bearing) use.

Enter 527 on Reader Card

Oil, gas burning equipment

COEN CO. is distributing two bulletins on its oil and gas burning equipment. Data Sheet 105 describes package burner units for gas or oil. The units include burner, windbox, damper, fan and fan drive. Bulletin PS-57 describes the firm's fuel oil pump and heater sets. Both give specifications and drawings of the units.

Enter 528 on Reader Card

Special purpose electrodes

THE LINCOLN ELECTRIC CO. is distributing Bulletin 7000.2, a new 20-page catalog and procedure guide for the firm's manual arc welding electrodes for hardsurfacing and for welding stainless steels, nonferrous metals and cast iron.

Enter 529 on Reader Card

Diamond core drills

E. J. LONGYEAR CO. has published Longyear World No. 7 providing information on the uses of diamond core drills, function of major parts, and illustrating the various types of drills and drilling rigs.

Enter 530 on Reader Card

(Continued on page 156)

PRODUCER

The Wemco Mobil-Mill:

Standard of the Aggregate Industry in Meeting Rigid Specifications with the Heavy Media Separation Process

The successful operator today reaches beyond the safety factor — to meet the toughest aggregate specifications. He protects himself with quality that will more than meet inspection — however critical.

Treatment of unusuable deposits can result in the production of a premium aggregate at surprisingly low cost. Coal, shale, chert, clayballs and other unacceptable materials are literally floated away.

Get *all* the facts . . . documented data and costs . . . on the Wemco HMS Mobil-Mill!

Depend on the Wemco Mobil-Mill and the skills behind it.

WEMCO®

Western Machinery Company
650 Fifth St. • San Francisco, California
and throughout the world

Enter 1052 on Reader Card

engine power
BY CATERPILLAR

Sand, gravel and rock companies:

Cut your equipment for both mechanical

Allen Ready Mix and Roverud Construction

PROBLEM:

Mechanical and electric power both are needed for a dredge

SOLUTION:

Put both ends of a single Cat Diesel to work

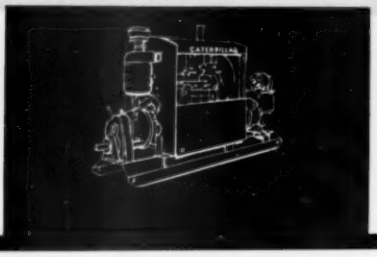
PROBLEM:

Excessive investment in engines

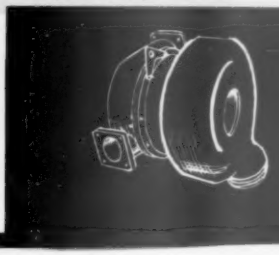
SOLUTION:

Use Cat two-handed Diesels

Nine basic Cat two-handed Engines range in size from the 650 HP (maximum output rating) D397 to the 75 HP D311 (Series H). These can be matched with generators to meet your exact job requirements.



Turbocharging is standard on most Cat Engines, giving more power per engine weight to make possible a much smaller engine package for a given horsepower requirement.



needs with <u>one</u> Cat Diesel and electric power

save money with Cat two-handed Diesels

Engine Division, Caterpillar Tractor Co.
Peoria, Illinois, U. S. A.

Bill and Sid Allen, owners of rapidly expanding Allen Ready Mix (left), faced the problem of replacing an old dredge that was giving erratic production of 90 t.p.h. A Caterpillar Dealer Engine Specialist was contacted. Knowing the Allen engine had to power a Thomas NHL pump, a 2" centrifugal priming pump and a 45 KW generator to handle the single drum hoist, and other electrical requirements, the CDES recommended a Cat D375 Turbocharged Engine, to furnish both mechanical and electric power.

This D375 (right), like all Cat Engines, has the bearing, block and crankshaft strength to take power off either end. The Allen Ready Mix D375 has shown after 1,100 hours that it's capable of handling the job of two "all-round" diesels of light-duty design. The V-belt drive transfers power from flywheel end; and a front-end shaft and V-belt drives the 2" priming pump and generator. Now this Memphis dredge produces 175 t.p.h.

One aggregate plant of Roverud Construction Co. was using four engines. Maintenance, portability, loss of production were problems. Partner Karl Hoegh (left) contacted his Caterpillar Dealer Engine Specialist. Solution: New Cat two-handed Diesels—a D397 at the Spring Grove, Minn., plant—a D375 at the Dakota, Minn., plant.

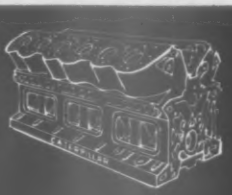
At left, the van-mounted D397 Turbocharged Engine direct-drives a Cedarapids 40" hammermill. And off the front of the engine a generator powers a 100 HP electric motor on the jaw crusher as well as motors on screens and conveyors. At right, the Turbocharged D375 is being set up for another combination drive application at the Roverud plant near Dakota, Minn.

Your Caterpillar Dealer Engine Specialist is your diesel power consultant. He's backed by quality parts reasonably priced, and a skilled staff of factory-trained servicemen. Call him now to avoid problems later.

Cat Generators have outstanding heavy motor starting ability, are simple and compact with no moving parts in the voltage control system. Output terminals are conveniently located for connection to panel or load. Generators are <u>matched</u> to engines.

Caterpillar's own foundry casts engine blocks of a special high-tensile-strength alloy, 50% stronger than ordinary gray iron castings. Further rigidity and strength are provided by numerous ribs and partitions.

CDES



NEW LITERATURE

(Continued from page 152)

Roll crushers

GRUENDLER CRUSHER AND PULVERIZER CO. is distributing Bulletin BR-15 describing its improved roll crushers. Easy maintenance and long life are claimed for the units, and features are pointed out which were designed to achieve these objectives.

Enter 514 on Reader Card

Air and gas scrubber

JOHNSON-MARCH CORP. has prepared Bulletin HP 955-A on its air and gas scrubber. The unit is said to trap non-condensable and normal dust materials below five microns in size. The bulletin gives capacities (500 to 40,000 cfm.) and describes construction features and typical applications.

Enter 515 on Reader Card

Pneumatic conveyors

THE DAY CO. is distributing a 12-page brochure on its line of high-density (fluidizing type) and low-density air conveying systems. The air-line conveying systems are said to be useful in loading and unloading, in-plant moving, mixing, drying and cooling any dry material.

Enter 516 on Reader Card

Cloth dust collectors

TORIT MANUFACTURING CO. has announced new information sheets on two cabinet cloth filter dust collectors. The sheets, containing multiple rating tables and specifications, describe the units as more than 99.9 percent efficient in the 500-cfm. range.

Enter 517 on Reader Card

Hydraulic weighing systems

A. H. EMERY CO. has published Bulletin 582, which describes the firm's hydraulic weighing systems and aids in finding the type and cost of the unit required. The firm's hydraulic units are commonly used with tanks, bins and hoppers.

Enter 518 on Reader Card

Two-way radio

GENERAL ELECTRIC CO., Communication Products Dept., has prepared a pocket-sized booklet on its two-way radio equipment. It describes the full line, and features new developments, including a set with completely transistorized receiver.

Enter 519 on Reader Card

(Continued on opposite page)

NEW LITERATURE

(Continued from opposite page)

Truck line

REO DIVISION has issued a 28-page booklet describing the division's complete line of trucks and engines. It gives weight classifications, general applications and major components available, and describes Reo's V-8 and 6-cylinder engines.

Enter 520 on Reader Card

Debt financing

ASSOCIATES INVESTMENT CO., ASSOCIATES DISCOUNT CORP. has prepared a booklet entitled "Money to Grow On" as a description of debt financing and approach to solving corporate financing problems. The firm's role in helping businesses plan for and raise money for expansion is discussed.

Enter 521 on Reader Card

Explosives

THE HERCULES POWDER CO. has issued two folders on its new Dynatex blasting agent. Form 200-80 discusses Dynatex, a nitro-carbo-nitrate blasting agent, lists weight strength, bulk strength, rate detonation, water resistance and equivalent 1¼ x 8 in. ctg. count. Form 200-83 lists economies obtained with Dynatex.

Enter 522 on Reader Card

V-belt drives

B. F. GOODRICH INDUSTRIAL PRODUCTS CO. has released a 12-page illustrated manual entitled "How to Get Longer Life from V Belt Drives." The manual tells how to select and install V-belts, how to detect belt trouble, diagnose belt failures, correct drive troubles. A list of valuable tips for proper belt maintenance is included, as well as a suggested inventory survey checklist for belt drives.

Enter 523 on Reader Card

Slings

MACWHYTE WIRE ROPE CO. for the first time has issued a bulletin that completely catalogues specifications, load ratings and standard fittings of the cable-laid and rope-laid "Safe-Guard" slings for sizes ¼ in. diam. to 1½ in. diam. The cable-laid slings are applicable where a soft sling body is required and flexibility is more important than resistance to abrasion. The rope-laid slings are for applications where abrasion resistance is a first consideration.

Enter 524 on Reader Card

END

NEW U.S. PATENTS

OLIVER S. NORTH

Recently issued patents on nonmetallic minerals*

Aggregates

2,861,004—Preparation of a premixed, pre-coated concrete aggregate consisting in part of **gravel** and/or **sand** and in part of a lightweight aggregate such as **expanded clay** or **shale,** expanded **perlite,** exfoliated **vermiculite, pumice** and the like. The sand-gravel is pre-coated with a hygroscopic calcium or magnesium salt first and then with a bituminous emulsion. This composite aggregate can be bagged, stored, and readily poured from the bag. (to G. Sucetti.)

Cement

2,857,286—In a process for rendering **portland cement** particles free-flowing yet not water-repellent, the dry cement particles are contacted in air with calcium acetate. The calcium acetate is formed in situ on the cement particles (to R. H. Striker; assigned to Missouri Portland Cement Co.).

2,858,020—Apparatus and method for rapid, economical separation of fine and coarse particle fractions in **portland cement** raw slurries. The sharpness of separation varies directly with the time taken by the slurry in passing through the plurality of chambers. The usual hydroclone frictional loss is minimized (to S. J. Bek; assigned to F. L. Smidth & Co.).

2,863,225—In this **portland cement** raw mixture preheating installation, the preheating is effected in stages. The cold raw mix goes through one or more low temperature stages with low-velocity flue gas in large-volume chambers. In the highest temperature stage, just before calcination, the heat exchange takes place with high-velocity flue gas in a cyclone. This method enables maximum utilization of waste heat from the rotary kiln and recovery of substantially all of the fines. (to G. C. Prüssing and B. H. Helming.)

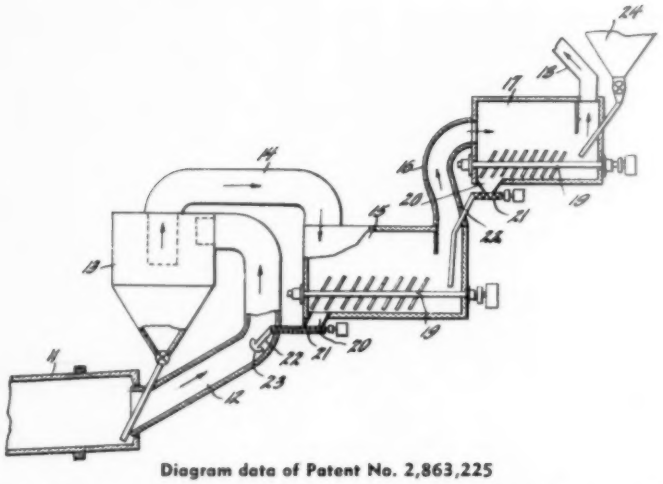


Diagram data of Patent No. 2,863,225

Fig. 1 shows a system having two large-volume preheating chambers (17 and 15) and a high-velocity cyclone (13). Arrows denote path of kiln gas flow from rotary kiln (11). An agitating device (19) throws the raw mixture continuously into the stream of gas and eventually discharges it through a worm (21) to the second chamber, thence via worm (21) through shielded kiln feeder pipe (22) and into the head end of the kiln.

Clays

2,857,285—A refractory mold coating comprises optimum proportions of Al_2O_3, **bentonite, ball clay,** and sodium silicate (to S. D. Stoddard; assigned to U. S. Atomic Energy Commission).

2,859,234—Method of manufacturing cation-modified **bentonite** complexes which swell in both polar and nonpolar organic liquids, thereby forming stable gels. Besides bentonite, the process may be applied to the Georgia-Florida type of **fuller's earth,** or **attapulgite,** and other clays characterized by an unbalanced crystal lattice (to A. G. Clem; assigned to American Colloid Co.).

Phosphate rock

2,861,869—In the processing of **phosphate rock,** a method is described for recovering P_2O_5 values that are usually lost as aluminum phosphate and iron phosphate in precipitates produced during purification of the digestion solution. (to D. H. Reeve. Assigned to U. S. Atomic Energy Commission.)

2,861,878—Production of complex fertilizers from **phosphate rock** and other fertilizer source materials. (to B. Bigot. Assigned to Societe Anonyme des Manufacturers des Glaces et Produits Chemiques de Saint-Gobain.)

Miscellaneous

2,857,331—An improved reagent for use in froth, skin, or tabling flotation concentration of **phosphate rock** is made by rapidly heating a mixture of (1) crude tall oil or the like and (2) a commercial polyamine. Other minerals that may be processed with this reagent are **barite, feldspar, fluorspar, kyanite,** and **silica sand** (to C. A. Hollingsworth, K. F. Schilling and J. L. Wester; assigned to Smith-Douglass Co., Inc.).

END

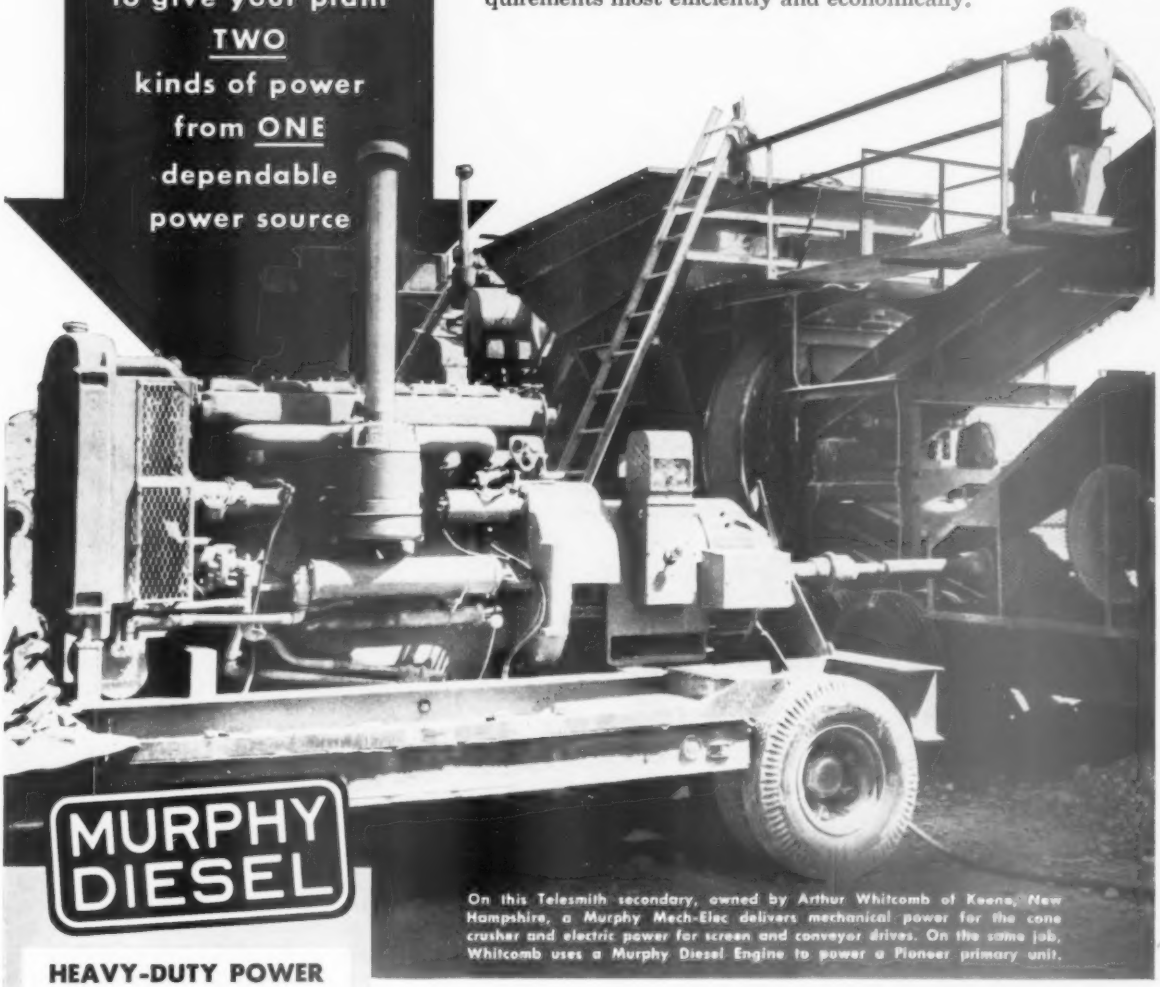
*Copies of United States patents are available at a cost of 25 cents each from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

MURPHY DIESEL MECH-ELEC

The simple profitable way to give your plant TWO kinds of power from ONE dependable power source

One of the most efficient and cost-cutting methods of turning pit or quarry run material into specification aggregate is to use a Murphy Diesel MECH-ELEC—the simple, compact, all-in-one power package that delivers a *combination* of heavy-duty mechanical power and low-cost electric power, separately or simultaneously!

Murphy MECH-ELEC units include all the features . . . "true" diesel operation, unit fuel injection, hydraulic servo-type governor, etc. . . . that have established Murphy Diesel's outstanding record of dependability and economy. From three MECH-ELEC sizes and generator arrangements your Murphy Diesel Dealer can help you select the unit to meet your requirements most efficiently and economically.



On this Telesmith secondary, owned by Arthur Whitcomb of Keene, New Hampshire, a Murphy Mech-Elec delivers mechanical power for the cone crusher and electric power for screen and conveyor drives. On the same job, Whitcomb uses a Murphy Diesel Engine to power a Pioneer primary unit.

MURPHY DIESEL

HEAVY-DUTY POWER for ROCK CRUSHING

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

MURPHY DIESEL COMPANY

5315 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

409R0

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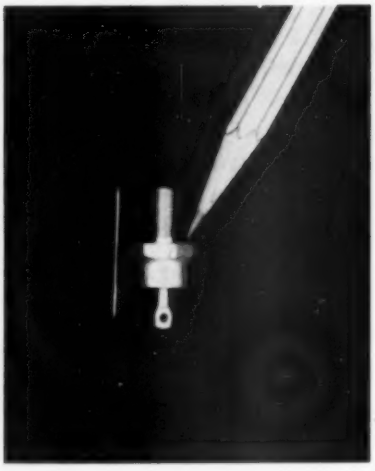
NEW MACHINERY



Brushless generators reduce maintenance

BRUSHLESS GENERATORS were developed by replacing the commutator of the standard-type generator with a network of silicon diodes which rectify the ac. output of the exciter to dc. field current. No brushes or slip rings are needed because all the components and their associated interconnections rotate as one.

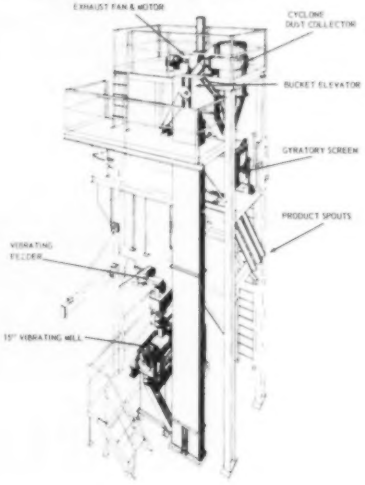
The basic parts of standard electric generators consist of a rotor, a stator and an exciter. The rotor consists of two, four, six or eight symmetrical poles with a magnetizing winding on each pole connected through slip rings and brushes with the exciter. Through the interaction of the exciter and the magnetized windings an electric current is generated in the stator.

Electrical design engineers have long sought ways to eliminate the two sets of brushes inherent in generators. The recent development of high-power miniature rectifiers led directly to the new brushless generator. One of these silicon rectifiers, no larger than a pin, is shown above, right. Its position on brushless generator is illustrated in the photo at left.

Maintenance is reduced in the brushless generator. Since there are no brushes, there are no brushes to replace. This is of special importance on crushing rigs where rock dust quickly corrodes the slip ring-commutator surfaces and results in very short brush life. The only points of maintenance on brushless generators will be the bearings, which must be checked and greased. *Electric Machinery Mfg. Co., 800 Central Ave., Minneapolis 13, Minn.*

Enter 100 on Reader Card

Package grinding plant



A PRE-ENGINEERED dry grinding plant consists of a vibrating mill and all auxiliary equipment, designed to deliver finely controlled product sizes at capacities up to 1 tph. Main components of the new plant have been selected and arranged within a rigid steel structure to provide operators with a well-balanced, "coordineered" circuit with reduced floor space requirements. Pre-engineering around a vibrating mill helps plant efficiency.

Complete to superstructure, the compact plant has all auxiliary equipment, such as vibrating feeder, elevator, gyratory screen, weighing device and dust collector conveniently accessible by ladders and walkways. Individual parts and components are match-marked to facilitate erection.

Utilizing only 127 sq. ft. of floor or ground space and relatively low head room, the dry grinding plant can be installed in an existing building.

Plant design allows each circuit component to do the specific, single operation for which it was intended. For example, the vibrating mill is used only for grinding, and product classification is accomplished in the gyratory screen. This closed-circuit operation increases the system's capacity and contributes to control of screen analysis through the elimination of overgrinding.

The package plant is designed for capacities up to 1 tph., depending on the material ground, while substantial holding bins and variable speed elevator and feeder make it possible to handle dry feeds ranging from 30 to 300 lb. per cu. ft. Dust collection is provided at all necessary points. *Allis-Chalmers Mfg. Co., Milwaukee 1, Wisconsin.*

Enter 101 on Reader Card

Dump trailers

TAILGATE GUIDES have been incorporated into the design of aluminum and steel dump trailers. Four guides are used, two in each side of the gate. The manufacturer states that this additional engineering feature keeps the trailer body from twisting excessively on rough terrain by keeping the gate stable and in place.

Rear mud flaps are incorporated with the tail gate as another feature of the trailers. Hooks are provided to which flaps can be attached during dumping operation. *Lodestar Corp., Niles, Ohio.*

Enter 102 on Reader Card

(Continued on page 163)

Enter 1026 on Reader Card

USS Forged Grinding Balls

hit a new high in performance!

New manufacturing facilities at U. S. Steel have now made possible forged steel grinding balls with three outstanding characteristics:

HARDNESS

The hardness patterns obtained in USS Grinding Balls assure superior grinding qualities and long service life in all types of grinds.

TOUGHNESS

To resist breakage, each size and type of USS Grinding Ball has the maximum toughness compatible with its depth of hardness.

UNIFORMITY

The exacting controls that are necessary in processing, particularly heat treatment, combined with frequent laboratory checks, insure consistency in quality—ball to ball and load to load.

There are two types of USS Forged Steel Grinding Balls available: USS Carbon-Manganese, for most mill operations, and USS Alloy Steel, for unusually severe grinding conditions. Both types are manufactured in the same sizes: ¾″, ⅞″, 1″, 1¼″, 1½″, 2″, 2½″, 3″, 3½″, 4″. To find out what makes the "good" grinding ball *you* need, send for our new free booklet, today. Just fill out and mail the coupon.

USS is a registered trademark

United States Steel Corporation
Room 2801, 525 William Penn Place
Pittsburgh 30, Pa.

Please send me a free copy of your new Grinding Ball Booklet.

Name .....

Company .....

Address .....

City ..... **State** .....

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

Rubber arteries serve the heart of this aggregate plant

Acme-Hamilton conveyor belting, nearly a mile of it on 16 Barber-Greene conveyors, carries aggregate from the pit to this washing, crushing and screening plant, stockpiles the different products, then loads them on barges. 4 men operate the entire plant! Impossible without dependable, trouble-free conveyors and Acme-Hamilton belting.

Cushion Covers, reinforced edges defy pounding impacts, cuts, abrasion and edge wear.

Breaker Fabric. Optional double cord fabric acts as second cushion, increases cover adhesion.

Fabric Plies. Impregnated with rubber add strength.

Rubber Skim Coat. Provides a resilient bed between plies.

Write Acme-Hamilton, Dept. Q2.

Acme Hamilton

Serving Industry Since 1870

MANUFACTURING CORPORATION, TRENTON 3, N. J.

Divisions: Acme Rubber Mfg. Co. • Hamilton Rubber Mfg. Corp.

ATLANTA • CHICAGO • HOUSTON • PITTSBURGH • INDIANAPOLIS • LOS ANGELES • NEW YORK • SAN FRANCISCO

Enter 1094 on Reader Card

NEW MACHINERY

(Continued from page 160)

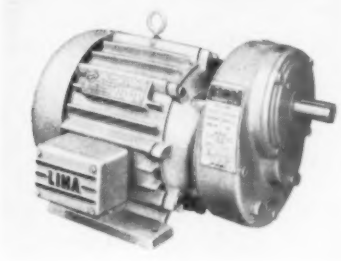
Sheave block

FORGED ALLOY STEEL construction of all major parts except the wheel and a new opening mechanism are major features of a new line of sheave blocks. The forged parts not only provide ruggedness to prevent shattering, cracking and springing of side plates but also are a safety feature, according to the manufacturer. Under extreme overloads, the hook will not snap off; but when overloaded at three times rated capacity it will begin to straighten and conditions can be remedied. The block is opened by turning the hook 90 deg. and pushing it aside. This design eliminates toggle pins, chains, bolts, nuts and cotter pins.

The block is available in 6, 8 and 10-in. sizes with choice of swivel hook, safety swivel hook, clevis, split clevis or swivel eye bolt and with open or fully shrouded side plates. A wide throat guide sheave block comes in the same sizes and with the same features. *Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.*

Enter 103 on Reader Card

Gearmotors



A NEW LINE of gearmotors consists of single, double, and triple-reduction units, mounted integrally with motors. Motor capacities are rated from 1 to 125 hp., with output reduction speeds from 780 to 7½ rpm. The gearmotors are adapted for horizontal foot-mounted applications.

The gearmotors are available in standard open construction for general-purpose use, totally enclosed fan-cooled models for dusty or high-humidity atmospheres and explosion-proof models for hazardous locations.

Standard electrical characteristics of the gearmotors are: normal torque, 3 or 2 phase, 60 cycle, 208, 220/440 or 550 v. Special voltages and frequencies, along with mechanical modifications, are available. *The Lima Electric Motor Co., Inc., Dept. 205, Lima, Ohio.*

Enter 104 on Reader Card

Grinding control units use sound recording

FOUR NEW "Electric Ear" control and observation units for grinding mills provide sound recording features not previously available, making possible both automatic capacity control and continuous observation of grind mill performance. The new recording feature indicates: (a) operating and shut-down time; (b) bin condition above feeder, if bridging or empty; (c) whether or not operator has changed control settings; (d) erratic mill operation due to feed size change, moisture variation or lack of attention of the operator.

The new "Electric Ear" models are: (1) The PSR, portable sound recorder, which provides a grinding mill observation unit (without control), using a 24-hr. circular chart recorder. It can be hooked into an existing feed control unit, or used separately. (2) The PSRS model, identical to the PSR in function, but employing a 9-day continuous strip-type recorder. (3) The DAR unit, with 24-hr. circular-chart recorder, providing both observation and grinding mill feed control. (4) The DARS unit, for same function as DAR unit, but with 9-day strip-chart recorder. *Hardinge Co., Inc., York, Pa.*

Enter 105 on Reader Card

Anti-rust oil

A NEW CORROSION PREVENTIVE was developed by combining rice oil with a drying agent. The product was tested by Texas Research Foundation, which reports no corrosion on metal protected by the rice oil in the standard aluminum strip test, and 10 percent corrosion in the standard iron strip test in which other oils permitted 20 to 100 percent damage.

The oil is combined with the drying agent in various proportions to make corrosion inhibitors with drying times ranging from 3 to 5 hr. to 7 to 10 days. A slow-drying oil is intended to loosen the rust on a surface that has already corroded, while a fast-drying combination would quickly put a coating on clean metal. The rice oil—as yet without a tradename—has been used experimentally by steel companies, shipbuilders and gas pipelines. *Comet Rice Mills, Dallas, Texas.*

Enter 106 on Reader Card

Sludge pump

AN AIR-POWERED SLUDGE PUMP can remove 42 gpm. of sediment-filled water at a 175-ft. head. The new pump, No. 275, has no motor and its few working parts are stainless steel and automatically lubricated. Designed for continuous two-stage breathing cycle, the pump draws in sediment by air suction until its tank capacity is reached, then automatically changes cycle to close the inlet valve, open the outlet valve and expel the contents under pressure.

Capable of entering an opening 18 x 12½ in., the sludge pump can draw in water containing sand, rock cuttings, and other sediment up to 20-ft. suction lift and deliver it up to 175-ft. pumping head. *Thor Power Tool Co., 175 N. State St., Aurora, Illinois.*

Enter 107 on Reader Card

(Continued on following page)

NEW MACHINERY

(Continued from preceding page)

Dust collector

A CYCLONE SEPARATOR, operating in the 2,000 to 3,000 cfm. range and designated Model No. 24, is designed to handle large volumes of bulky dust. Its new self-cleaning radial fan design is said to give high performance at low horsepower requirements. The 24 FM model is designed for outside exhaust. When it is desired to save heat and recirculate cleaned air, FB models equipped with cloth after-filter bags are also available.

In addition to the radial fan, other design features include long tapering cone design, high inlet velocities and location of the fan on the clean air side of the system to eliminate possible fan damage from heavy material being separated.

Operated by a 7½-hp. motor, the No. 24 has a 10-in. inlet and 12-in. outlet. The standard series 24 base contains a convenient pull-out drawer with 9 cu. ft. storage capacity. *Torit Mfg. Co., Walnut and Exchange Sts., St. Paul, Minn.*

Enter 108 on Reader Card

Anti-friction lubricants

TWO NEW ANTI-FRICTION lubricating compositions are said to have no melting or dropping point. Of special use in the earth-moving, mining, quarrying, processing and manufacturing industries, the anti-friction compositions protect roller, ball and sleeve bearings and sliding surfaces in "hot" bearing applications or in areas with high ambient heat.

Typical applications for the new lubricants are hot bearings on draglines and shovels, bearings or sliding surfaces on hot conveyor lines, chemical and food processing equipment, hot and cold tunnel-car bearings, high-temperature bearings on shaker screens and bearings on pelletizing equipment in the mining industry.

Among the characteristics claimed by the manufacturer are moisture resistance, high chemical stability, heavy molecular structure with exceptional metal adherence properties, temperature-reducing qualities and high E.P. (extreme pressure) values.

The anti-friction compositions are available in two grades. Anti-friction composition No. 1 has light density and is recommended for high-speed, high-temperature applications. Anti-friction compoistion No. 2, with its heavier density, is for low-speed, high-temperature applications or for loosely fitting bearings.

Both grades are available in 14½-oz. cartridges for application with lever-type cartridge guns and in regular bulk containers for use with automatic systems, grease cups, pressure systems or grease guns. *The Whitmore Mfg. Co., Cleveland 4, Ohio.*

Enter 109 on Reader Card

Truck crane

THE MODEL 330 truck crane lifts up to 60,000 lb. when working at a 15-ft. radius. Boom jibs 15, 20, 25 and 30 ft. long can be added to a maximum 120-ft. of boom for unusually high lifts. Boom lengths up to 80 ft. are allowed for bucket work.

Both automatic power boom-lowering and safety boom-limit stops are standard equipment. The manufacturer's combination pin-pad connected boom, which permits two-man boom-length changes, is also standard on the model. Lugs on the boom allow folding at any joint.

Total weight of the new truck crane (with a 30-ft. boom) is 67,830 lb. This can be reduced to 46,960 lb. by removal of boom, outriggers, pedestals and counterweight. The counterweight is removed by power-lowering the A-frame. *Koehring Div., 3026 W. Concordia Ave., Milwaukee 16, Wis.*

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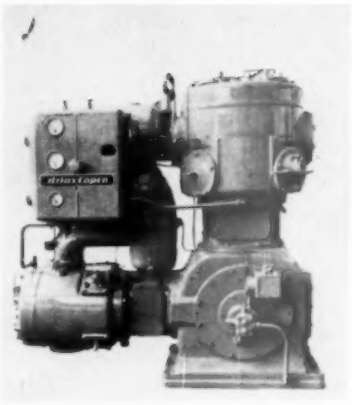


Air compressor

AN INTERMEDIATE-SIZE stationary air compressor delivers up to 835 cfm. of air at 100 psi. Designated the AR-4, the 5,610-lb. compressor can be operated both as a skid-mounted, semi-portable unit and as a stationary machine. Designed for heavy-duty, three-shift operation, the AR-4 is manufactured from Swedish steel.

Operating speed is 450 rpm. The compressor features L-shaped, two-stage, double-acting, cross-head design and incorporates vertical low-pressure and horizontal high-pressure cylinders. A twin-element, water-cooled intercooler is located in the angle between the cylinders. Cooling water consumption of the AR-4 is 350 gal. per hr. The model is equipped for either V-belt drive or direct drive from low-speed motors. It stands 6½ ft. high, is 5 ft. 5 in. deep and 38 in. wide. *Atlas Copco, 610 Industrial Ave., Paramus, N. J.*

Enter 111 on Reader Card

Truck axles

INTRODUCTION OF three new two-speed, double-reduction-type rear axles for heavy-duty International trucks has been announced. These axles—the RA-162, RA-167, and RA-172—are available for Models A-184 and AC-1890 and 190, 200 and 220 series trucks. All are suitable for highway or off-highway operation.

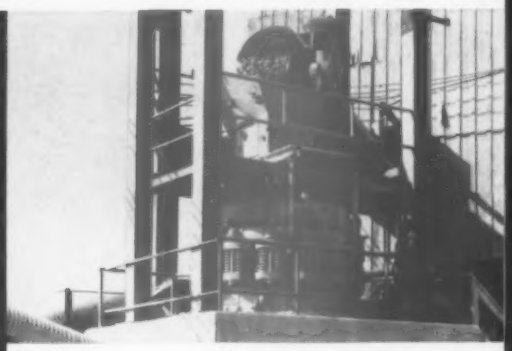
The RA-162 is rated at 18,500-lb. carrying capacity and is used in vehicles having 25,000-lb. gross vehicle weight rating and a 50,000-lb. gross combination weight. The RA-167 is rated at 23,000-lb. carrying capacity. It is used in vehicles having 29,000-lb. GVW and a 55,000-lb. GCW. The RA-172, rated at 23,000-lb. carrying capacity, is used in vehicles with 30,000-lb. GVW and 65,000-lb. GCW. *International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.*

Enter 112 on Reader Card

(Continued on page 166)

Enter 1108 on Reader Card

BIG TONNAGES of quality aggregate produced at low cost with SYMONS® Cone Crushers



for STATIONARY service . . . Symons Cone Crushers are built in Standard, Short Head, and Intermediate types, with crushing heads from 22" to 7' in diameter—in capacities ranging to 900 or more tons per hour, for primary, secondary and finer reductions.

for PORTABLE service . . . Symons Cone Crushers are being used in increasing numbers for portable and semiportable crushing plants. Illustrated is a typical Cedarapids® Intermediate Scalping Unit, using a 4-ft. Symons Cone Crusher. Unit is serving a large Midwest sand and gravel producer.

Typical of today's modern highway construction is this view of the modern Freeway in Oakland, California, showing three levels of highway structure over two levels of railroad.
(Photo courtesy California Division of Highways)

C-159

The big tonnages of specification aggregate, bituminous mixes, crushed sand and cement required to meet the ever-increasing needs of the construction industry are produced by Symons Cone Crushers at low cost. Good reasons why these efficient crushers are the leading choice of producers and contractors building highways, dams and hydro projects, bridges, as well as commercial building construction.

It will pay you to specify and use Symons Cone Crushers for both stationary and portable service. *Write for descriptive literature.*

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

NORDBERG MACHINERY

NORDBERG

SYMONS . . . a registered Nordberg trademark known throughout the world

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SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

NEW MACHINERY

(Continued from page 164)

Four-axle diesel

THIS 8-WHEEL, TILT-CAB DIESEL makes possible top legal payloads where 60,000 lb. gross vehicle weight is permitted if the weight is borne by four axles. Chassis weight of this 923C-36M model is unusually low, despite its "tandem-tandem" construction. It weighs only 20,600 lb., including a 17-ft. dump body of 18½ cu. yd. capacity, ready for the road.

This light weight was engineered with aluminum used liberally throughout the entire unit. Cab, frame crossmembers, fuel tanks, engine flywheel housing, gear cover, oil pan, large capacity dump body and other elements are constructed of aluminum. This Diamond T diesel hauls nearly 20 tons legally in Pennsylvania. Weight of the loaded truck is distributed with 24,000 lb. on the tandem front axles and 36,000 lb. on the rear. It is powered with the Cummins NH-180 diesel engine. *Diamond T Motor Truck Co., 4401 W. 26th St., Chicago, Ill.*

Enter 115 on Reader Card

Drilling machine

THE MODEL 60 DRILL is designed for large or deep water wells, deep exploration drilling or shallow production. The complete drilling machine mounts on a heavy-duty special frame trailer with tandem rear axle and can be supplied with front dolly for pulling the trailer. By removing the front dolly, a truck tractor can be used for moving the unit as a semi-trailer.

All units, such as mast, engines, pump, drawworks, rotary table and fuel tank, are individually mounted. The drill is equipped with a heavy-duty, one-section derrick which has a height of 48 ft. above rotary table. This permits either range one or range two drill pipe to be pulled in singles. An additional 10-ft. section can be furnished, making 58 ft., which would permit pulling in doubles of range one pipe.

The drawworks and rotary table are powered by a diesel engine equipped with torque converter and three-speed powershift transmission. Power is supplied to the mud pump by another diesel engine through a heavy-duty V-belt drive. This permits the pump speed to be varied without changing the speeds of the rest of the drill. *Franks Machine Co., Enid, Okla.*

Enter 116 on Reader Card

Industrial tractors

PRODUCTION IS UNDER WAY on two new diesel-powered industrial tractors, the "440" crawler and the "440" wheel models. The new tractors are powered by the General Motors "Jimmy" diesel 2-cycle engine.

According to the manufacturer, the new diesel-powered tractors will deliver approximately 10 percent more power than previous "440" models. The diesel engine has a 3⅞ in. bore and 4½ in. stroke, with rated horsepower of 33¼ at 1,850 rpm. Displacement is 106.1 cu. in.; compression ratio is 17 to 1. Maximum torque at 800 rpm. is 108 lb.-ft.

The "440" tractors will continue to be offered with gasoline engines. *Deere & Co., Moline, Ill.*

Enter 117 on Reader Card

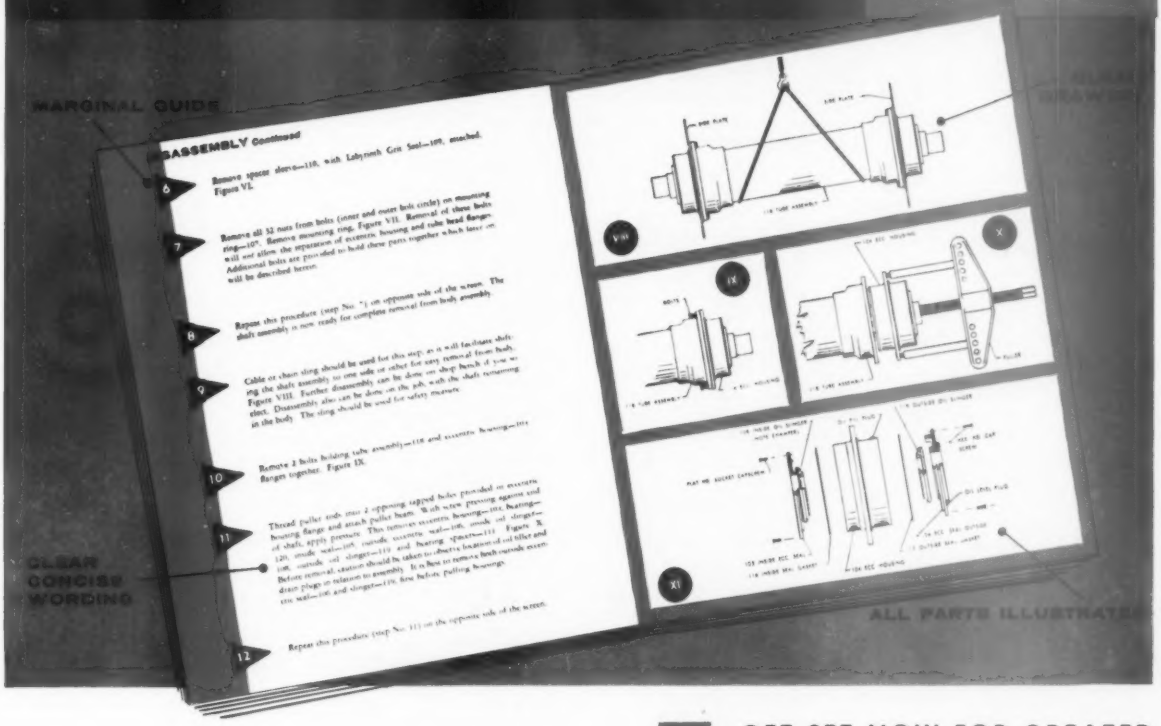
(Continued on page 168)

HERE ARE MAINTENANCE SERVICE MANUALS DESIGNED WITH YOU IN MIND!

OPERATION

SCREENING

EFFICIENCY



Why did we take such pains to prepare clear, concise illustrated maintenance manuals for SECO screens?

That's easy to answer . . . it's another example of our recognized responsibility to you . . . to help you get the maximum performance from your SECO screens with the minimum of downtime.

We build SECO screens to give you high tonnages of accurately sized materials and to stand up when the going is tough. These manuals show you how to install and maintain this equipment for best results. There's nothing left to chance . . . when it comes to serving SECO customers.

SCREEN EQUIPMENT COMPANY, INC.

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GET SET NOW FOR GREATER SCREENING EFFICIENCY

Put rugged, high tonnage SECO screens on your job. Today's requirements for volume screening of clean, accurately sized materials make it a must for you to invest in the best equipment made. That means SECO . . . over 500 models 4-Bearing and TWIN BEARING Vibrating Screens.

Send for 4-BEARING CATALOG NO. 204 OR TWIN BEARING BOOKLET TB-21

SECO

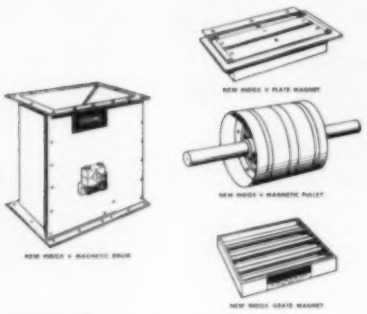
TRUE CIRCULAR ACTION

VIBRATING SCREENS

Enter 1060 on Reader Card

NEW MACHINERY

(Continued from page 166)



Tramp iron separators

FEATURE OF A NEW LINE of tramp iron separators is the use of Indox ceramic permanent magnets. The ceramic material is barium ferrite, pressed into a compact under great pressure and permanently magnetized to produce a flux pattern for effective tramp iron separation.

Indox V magnetic pulley installed at head of belt conveyor system is said to equal deep-field power of electromagnetic types. Radial design of magnet assembly is said to boost holding efficiency.

Indox grate magnet can be installed in hopper or floor opening, chute or duct. Collecting tubes have continuous magnetic poles, no "dead" spots.

Indox V magnetic drum is designed for process industries where granular materials are conveyed in enclosed chutes and spouts. Revolving stainless steel cylinder inside housing carries material over stationary magnet assembly, which holds tramp iron particles beyond discharge of non-magnetic product.

Indox V plate magnet provides a powerful, uniform magnetic field which traps iron particles in flowing material in chutes, ducts, spouts or on conveyors. *Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wis.*

Enter 114 on Reader Card

Front-end loader

A NEW RUBBER-TIRED, four-wheel-drive front-end loader, the H-90, will replace the former HO model. The model designation of this new unit, like all recently introduced Payloader models, is based on the load-carrying capacity. In this instance it is 9,000 lb. at average travel speeds. Both gas and diesel power units are offered. Buckets to handle materials of various weights within the recommended carry capacity of 9,000 lb. are available in sizes from 1½ to 5 cu. yd., SAE-rated bucket sizes.

The most noticeable change in the appearance of this new model is the "low-profile" front shroud which re-

portedly gives the operator improved visibility and makes for easier, faster and safer operation. This unit has a breakout force of 21,000 lb. and a bucket tipback of 44 deg. at ground level. It has torque-converter drive, power-shift transmission and new heavy-duty planetary axles.

A cartridge-type oil filter has been built into the hydraulic reservoir to separate oil filters for both engine oil and transmission, torque-converter oil. Power-transfer differentials which automatically transfer up to 24 percent more torque to the wheels with the best footing under slippery conditions are another feature. *The Frank G. Hough Co., 705 Seventh St., Libertyville, Ill.* **END** ***Enter 113 on Reader Card***

"Not merely to sell; but to serve . . . not only to make good steel products; but to make them still better . . . not only to fulfill today's requirements; but to anticipate tomorrow's—these are the principles that constantly guide CF&I."

G. F. Stanz
President

Grinding Mill Bulletin #3

This series of ads on grinding ball rationing of the makeup charge is being presented by CF&I in keeping with our policy "*Not merely to sell; but to serve*". It is our hope that the series will shed some new light on the subject by expressing established principles in practical terms, and that grinding mill operators who are interested in increasing the efficiency and production capacity of their ball mills will find this information of value.

The One-Size Ball Makeup Charge In An Operating Mill

Previous articles in this series have pointed out that determining the optimum size assortment of grinding balls that should be added as a makeup charge is a practical means of improving mill operation; and that the best makeup charge of one-size balls should be established before an attempt is made to work out a rationed makeup charge.

It is better to use oversize rather than undersize balls in the makeup charge. The reason for this is that there is always the possibility of encountering ores that are more difficult to grind. The larger ball would reduce this difficult-to-grind ore, whereas a smaller ball would not. This leaning towards oversize balls is recommended even though they will give fewer contacts and less attrition grinding than a smaller ball.

Indications of Incorrect Ball Size

In a closed circuit mill, a too-small ball size will fail to reduce larger feed particles, and too much tramp oversize will be circulated. Thus, the circuit will become choked, and you will find it necessary to reduce mill feed. With a too-large ball size, coarse particles will be reduced in size, but excessive amounts will need further reduction and excessive slimes may be produced from the impact of large balls. The partially reduced ore particles will overload the classifier, making a reduction in mill feed necessary. Thus both too-small or too-large balls will lower mill production.

In an open circuit mill, balls that are too large do not produce the fineness of grind, or liberation size, required, and they may produce too many slimes. Grinding balls that are too small, on the other hand, permit tramp oversize to enter the next process.

Price May Be Deciding Factor

The 3″ diameter steel ball is commonly the lowest-priced ball available whereas small size grinding balls are priced higher. The 3″ balls are used most frequently in beneficiation mills and are usually obtainable on an immediate-shipment basis. However, where 3½″ and 3″ diameter balls give similar results in grinding a particular ore, the 3½″ ball may be chosen because of the insurance it provides against the production of tramp oversize should more difficult-to-grind feed ore be encountered later. Nevertheless, the lower price of the 3″ ball may be the deciding factor.

Radical Changes are Undesirable

As in other experimental work in an operating circuit, it is good practice not to make too radical a change in the ball size used. Where it is indicated that 4″ diameter balls would be more satisfactory than the 3″ balls in use, it would be wiser to test 3½″ balls first, then check results to prove you are going in the right direction. Or, if it is considered that 2½″ balls will improve results as compared with the use of 3″ balls, it may be better to substitute 2½″ diameter balls for one-quarter or one-half the charge and then check for improvement before using 2½″ balls as 100% of the makeup charge.

Whatever the optimum size grinding ball you need for the makeup charge in your operating mill, you'll find it available from CF&I . . . in diameters from ¾″ to 5″. CF&I grinding balls are forged from special analysis steel and are carefully inspected—throughout production and again immediately prior to shipment—to ensure that they are free of surface pits, circumferential ridges or other surface unevenness. The CF&I representative nearest you will gladly give you complete details.

In the next article in this series, we will discuss general methods of rationing, and the specific steps to be taken in working out a ball ration.

For a reprint of the article on which this ad is based, please write on your company letterhead to: Mining Supply Department, The Colorado Fuel and Iron Corporation, P.O. Box 1920, Denver, Colo.

OTHER CF&I STEEL PRODUCTS FOR THE CEMENT INDUSTRY
CF&I Grinding Rods • CF&I Grader Blades • CF&I Industrial Screens
CF&I Mine Rail and Accessories • Wickwire Rope • CF&I Rock Bolts

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THE COLORADO FUEL AND IRON CORPORATION

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Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

6083-A

Enter 1054 on Reader Card

Keep your mittens on! You can still make those tight, double-half-hitch connections with your Primacord down-lines, when your trunk line is Ensign-Bickford Low-Temp Plastic Primacord.

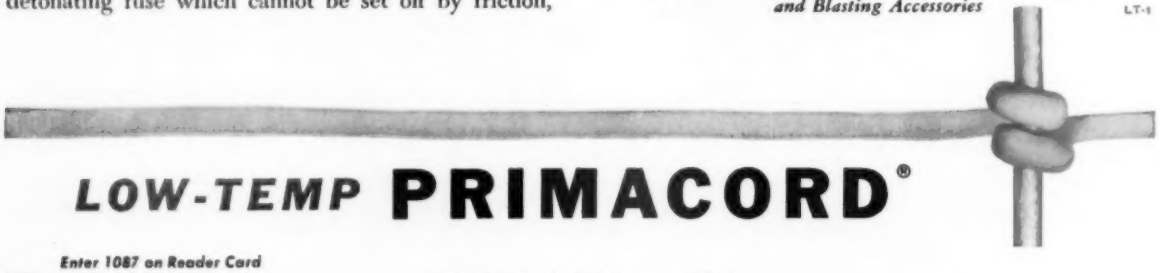
Low-Temp Primacord remains flexible at low temperatures. It forms knots and half hitches that can be drawn up tight without slipping. Its resistance to oil and water penetration is superior to the textile-clothed Primacords. It is light in weight, tough and strong — easy to handle even when you have your mittens on!

Now add the well-known Primacord advantages: 1) Less hazard because Primacord is the insensitive detonating fuse which cannot be set off by friction, ordinary shock, sparks or stray electrical currents. It must be detonated with fuse and cap or electric blasting cap, attached to the trunk line *only* after all is ready for the blast. 2) While the detonation wave of Primacord travels at nearly four miles a second, it provides the infinitesimal interval between holes and rows of holes sufficient to effect relief of burden, with better fragmentation, easier digging, less secondary blasting.

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut • Since 1836

Primacord® and Detacord® Detonating Fuse, Safety Fuse, Ignitacord®, Quarrycord®, Pyrotechnical Devices and Blasting Accessories

LT-1



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FEBRUARY, 1959
Chicago 3, Illinois

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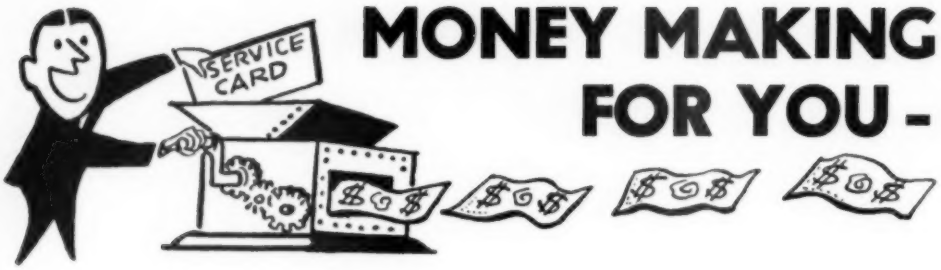
79 WEST MONROE ST.
CHICAGO 3, ILL.



MONEY MAKING IDEAS FOR YOU - - - FREE

READER-SERVICE CARD

RP-2-59

ROCK PRODUCTS
79 W. Monroe St.

FEBRUARY, 1959
Chicago 3, Illinois

Cannot be serviced after April 1, 1959 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

MAIN PRODUCT OF PLANT_____ CAPACITY_____

[THIS INFORMATION WILL HELP US GIVE YOU MORE COMPLETE SERVICE.]

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

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79 WEST MONROE ST.
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ROCK PRODUCTS
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How to use:

Each advertisement in this issue is provided with a key number, so is each new machinery and new literature item. For more information on any of these items simply fill in the key numbers in the appropriate space on the adjoining card and send it to us. We'll do the rest.

Enter 1110 on Reader Card

How 2 cu. yd. Trojan handles all loading operations for Midland, Texas Plant.

Replacing another tractor shovel, this Trojan 154 gives a production boost to the ready-mix plant of West Texas Concrete Products, Inc. The precision control, fast travel speed and high capacity allow it to keep the batcher loaded and still handle truck loading, stockpile maintenance and other chores around the plant.

Trojan 154 digs in, moves material and charges batcher on a fast, continuous cycle.

Your TROJAN distributor can help you with the many advantages of YALE Financing plans, the most complete ever offered to equipment buyers . . . TIME PAYMENTS, LEASING PLANS (with or without OPTION TO PURCHASE) . . . exactly what you need to finance your new TROJAN machines.

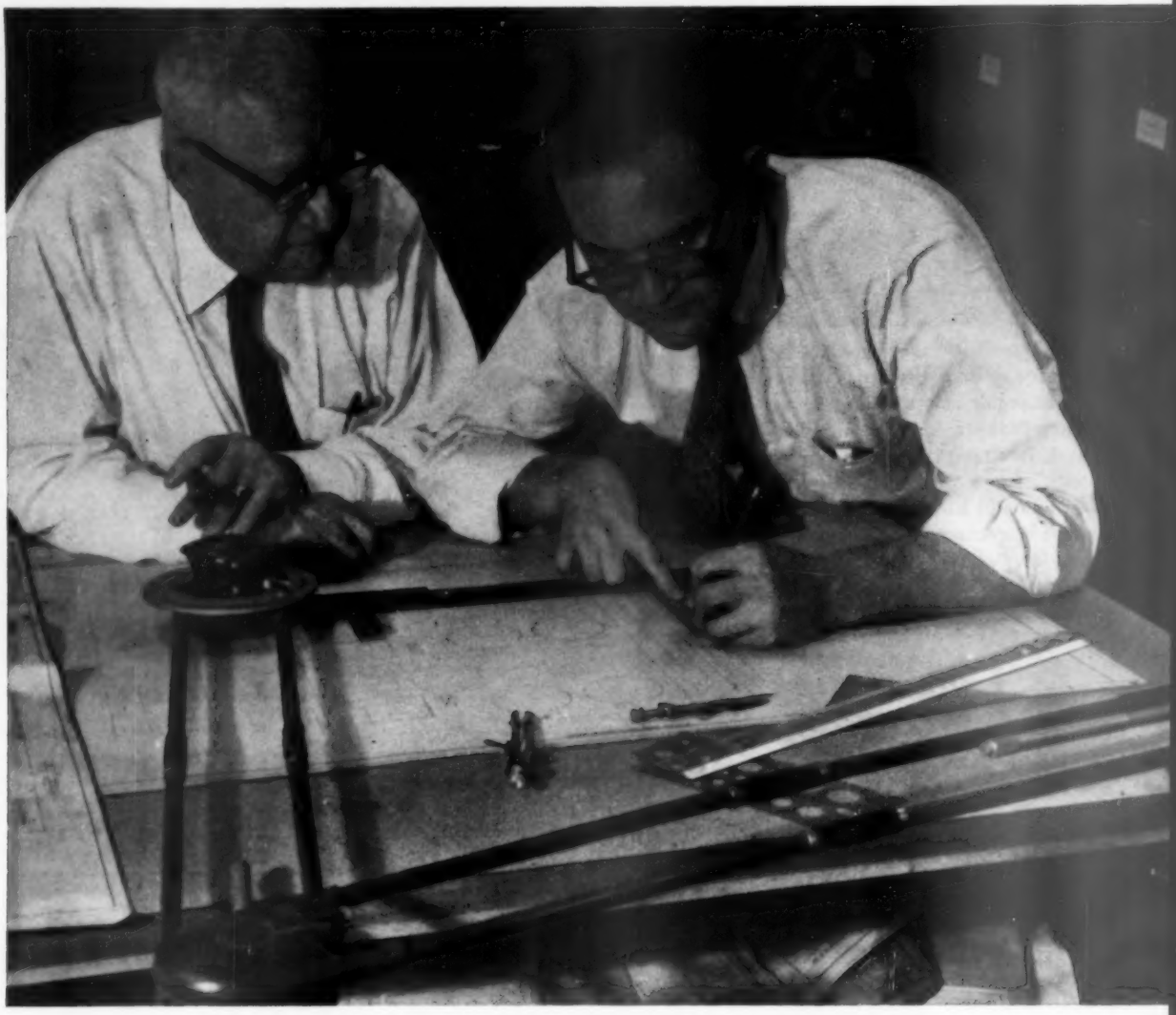
TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

TROJAN 154 BETTERS RATED CAPACITY—PROVES "INDISPENSABLE" IN READY-MIX PLANT OPERATION

High capacity and precision control were the features that sold West Texas Concrete Products, Inc. on the Trojan 154. They needed a fast operating machine with the ability to dump exact amounts of material into the batcher. This was no problem for the Trojan 154. . . . But they required a machine with a 2½ cu. yd. capacity. A trial of the 2 cu. yd. model 154 proved that the Trojan could better its rated capacity by ½ yd. load after load, day after day, and still maintain work cycles fast enough to allow it to handle other jobs around the plant area. "The Trojan 154 is a fast loading, fast travelling machine." says Mr. John Marlow, Plant Superintendent of the Midland, Texas Plant. "Its part in boosting the speed of our operation has meant considerable savings for us."

A loading operation for the Trojan tractor shovel involves carrying 6,000 lbs. of rock, 8,000 lbs. of regular sand and one load of fine sand — dumping the correct amounts into the batcher and returning the surplus to the stockpile. The batcher, in turn, dumps the mixture into the ready-mix truck. The fast loading cycles of the Trojan 154 help to complete this entire operation in six minutes.

TROJAN DIVISION, THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK, SAN LEANDRO, CALIFORNIA



DESIGNS of more efficient machines—or of a complete pack house from bins to loading dock—are continually being developed by St. Regis engineers.

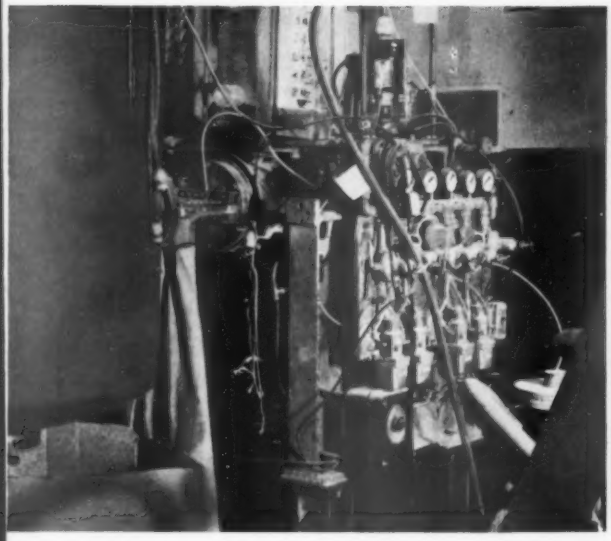
MEN AT WORK: PLANNING

L.C.P.T.—lower cost per ton (or per barrel)—means economical multiwall packaging of cement. It is brought about by a combination of research, bag design, packaging equipment and materials handling methods—all working together.

St. Regis maintains the widest range of research, engineering, development and testing facilities in the Industry. That is why St. Regis bags and equipment produce L.C.P.T. packaging today. That is the reason why St. Regis is able, also, to make continuous efforts toward producing cleaner bags, closer control of weights and even more efficient packaging methods.

At Providence, machines are designed, developed, built in prototype. They are shop tested, put on the job in the field. Then—and only after this exhaustive testing—they are manufactured for the cement industry.

In Pensacola, specialized experience and equipment, backed by extensive research facilities, result in better bags for the cement industry. Latest and most efficient



FLOW of solids is a new area for research that has been pioneered by St. Regis to help cement packers achieve lower cost per ton (or barrel) output.

PRODUCTION facilities at Providence where better machines are built. Seen under construction are 150FC packers (foreground)—latest in the cement field.

BAG DESIGNS that *sell* are a specialty of the St. Regis Pensacola facilities. A portion of the design department is shown here.

DELIVERY to meet your needs is assured by the strategic location of the eight St. Regis multiwall bag plants. Prompt service helps you to keep inventories at economic levels.

L.C.P.T. PACKAGING FOR YOU!

cement bag is the super stepped-end multiwall bag.

In the field, St. Regis Sales Engineers bring unrivalled knowledge of both packaging and the cement business to bear on the specifics of each problem. Conveniently-located plants assure you of bag supply at all times.

Whether you need a single machine or a complete pack house, St. Regis can supply or design and produce the equipment you require.

In Multiwall Packaging, St. Regis Means Lower Cost Per Ton

MULTIWALL PACKAGING DIVISION

St. Regis PAPER COMPANY

150 EAST 42ND STREET, NEW YORK 17, N.Y.

Enter 1102 on Reader Card

JOB RECORDS PROVE

New Firestone Super Rock Grip Deep Tread slashes mining haul costs!

Firestone's new Super Rock Grip Deep Tread tire is setting long-wear records on the toughest hauls in the roughest terrain! The non-directional super tread is 50% deeper and has a thicker base compounded with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires. This all-new tread design spaces massive traction bars for top traction and better body protection. And with 50% more non-skid tread, operators report double the hours of original tread service! Extra-heavy sidewall construction is your best insurance against cuts and snags. The cord body is built with extra plies of Firestone S/F (Shock-Fortified) cord for reserve strength, longer life and more retreads. Ask your Firestone Dealer or Store about these tubeless or tubed heavy-duty Super Rock Grip Deep Tread tires today.

Super Rock Grip Deep Tread

Firestone

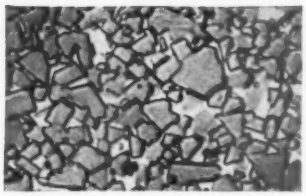
BETTER RUBBER FROM START TO FINISH

When ordering new equipment always specify Firestone tires.

Enjoy the Voice of Firestone on ABC television every Monday evening.

Enter 1085 on Reader Card

Longer bit life— with *new* Sandvik Coromant Bits



Sandvik Coromant Tungsten Carbide (Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities – therefore stronger, longer-lived.

Low quality Tungsten Carbide (Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.

NEXT time you buy bits, specify Sandvik Coromant because they give more footage per bit, lower drilling costs. Here's why:

1 Only first-quality tungsten carbide is used —as shown in the microphotos above. This means less wear, longer life and a better job.

2 The bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.

3 The bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels — the most widely used in the world — and Sandvik Coromant extension steel equipment.

Sandvik Coromant Detachable Bits are Available in the following Thread Sizes and Bit Diameters

Type	Thread	Available Diameters, in Inches															
		1¼	1⅜	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2⅜	2½	2¾	3	3½	4	4½	5
SHOULDER	TAPER	x	x	x	x													
	F		x	x														
	113		x															
	H			x	x	x	x	x		x								
	115			x	x													
	D						x	x	x	x	x	x	x	x				
	K													x	x	x	x	
BOTTOMING	1" Rope				x	x	x	x		x								
	1¼" Rope						x	x	x	x		x		x				
	400						x	x		x		x						
	1½" Rope											x	x	x	x	x		
	600											x	x	x	x			
	700													x	x			
	J 7.5															x	x	
	2" Rope														x	x	x	x
	1000																x	

Write or phone today for further details to either of the addresses below:

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

Atlas Copco

930 Brittan Avenue
San Carlos, Californ'a
LYtell 1-0375

Enter 1076 on Reader Card

MANUFACTURERS NEWS

Harnischfeger Corp. celebrates 75th birthday

THE HARNISCHFEGER CORP., Milwaukee, Wis., opened the celebration of its 75th year with the announcement that it will bring out four or five new excavator models and a new line of truck cranes this year. At a press conference announcing the opening of a series of company-wide celebrations beginning this month, president Walter Harnischfeger said his firm is looking more to the future than to the past. "In today's expanding economy it is undeniably true that the company which stands still slowly falls behind." Only by growing can the firm prosper, he said. Sales were a break-even $69 million in recession 1958, the firm noted. The photo shows the main plant in West Milwaukee that makes shovels, cranes and hoists.

Quick-Way, General Trading combine operations

THE QUICK-WAY TRUCK SHOVEL Co., Denver, Colo., has completed arrangements for joint manufacturing operations in its plant with General Trading Co., Minneapolis, Minn. General Trading markets automotive parts and accessories, industrial supplies and heavy hardware. The firm is a subsidiary of H&B American Machine Co., Inc., of Culver City, Calif. Quick-Way, subsidiary of Penn-Texas Corp., New York City, makes truck and crawler-mounted shovels and cranes.

Porter acquires Thermoid

THERMOID Co., Trenton, N. J., maker of industrial rubber and friction products, became the Thermoid Division of H. K. Porter Co., Pittsburgh, Pa., on December 11. The division merges with Porter's former Quaker Rubber Division, a move said to provide Thermoid with a broader line, better manufacturing facilities and stronger research and marketing departments. The move was made following approval by the boards of both firms and more than 80 percent of Thermoid's stockholders.

In another company action, Wilfred H. Stewart was named manager of engineering services for Porter's Refractories Division. Mr. Stewart, whose last position was with the industrial furnace division of the Sunbeam Corp., has had 18 years' experience with aluminum.

Black heads CIMA council

WALTER W. BLACK has been named chairman of the newly organized service management council of the Construction Industry Manufacturers Association. Mr. Black is general service manager, International Harvester Co., Construction Equipment Division, Melrose Park, Ill.

The new council, with 75 member firms already enrolled, was formed to help association members give their customers better service. Better parts-supply and distributor-guidance programs are typical of the activities planned by the new service management group.

AC may get hydraulics firm

ALLIS-CHALMERS MANUFACTURING Co., Milwaukee, Wis., announced November 25 that it would acquire the S. Morgan Smith Co., York, Pa., a major maker of hydraulic turbines, valves, water-handling equipment and axial-flow pumps, subject to approval of Smith's stockholders. The Pennsylvania firm employs more than 1,000 persons and had 1957 sales of about $23 million.

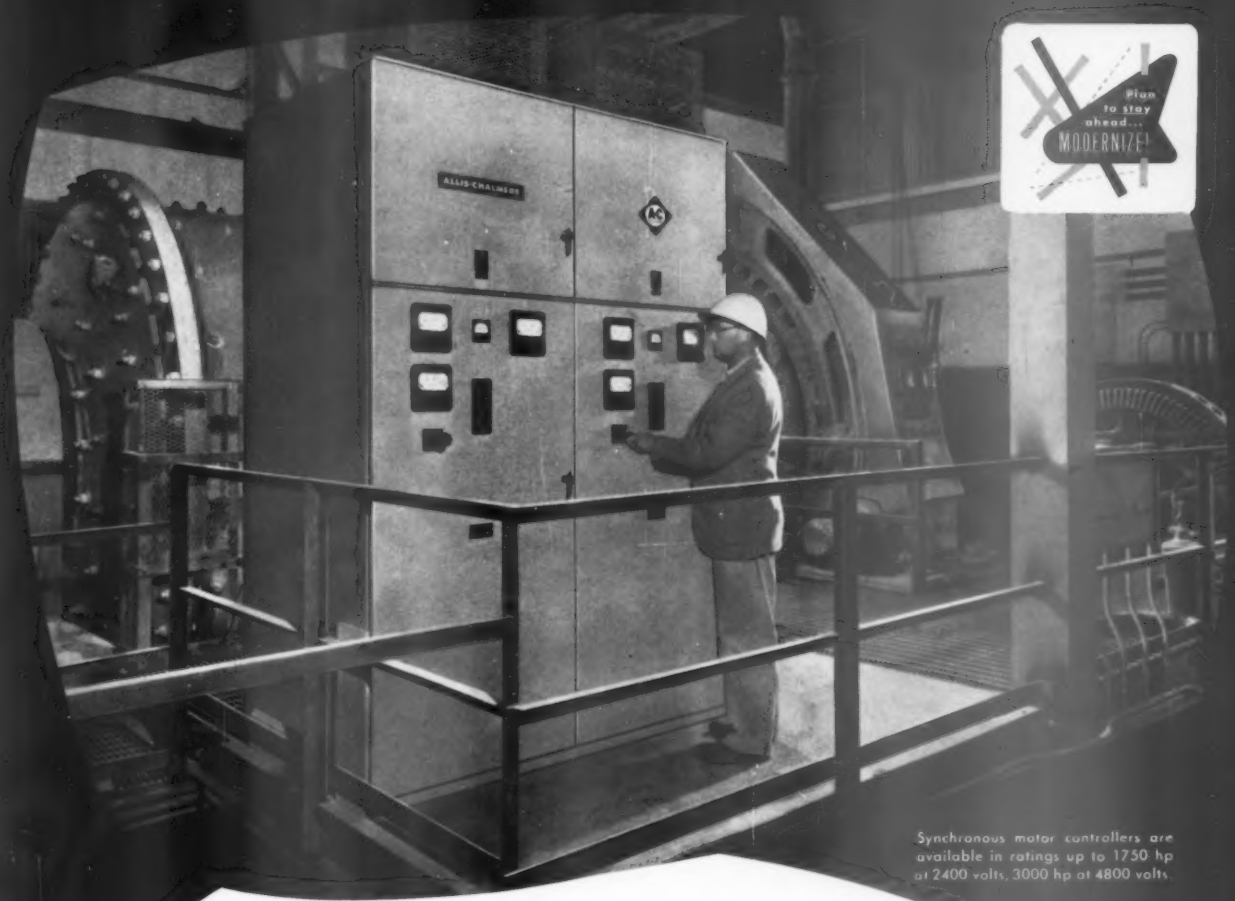
Allen heads Bucyrus-Erie

ROBERT G. ALLEN was named president of Bucyrus-Erie Co., South Milwaukee, Wis., at a recent board meeting. He succeeds William L. Litle, who continues as board chairman and senior officer. Mr. Allen joined the firm in 1957 as vice president.

Other men moving to new positions are Victor C. Studley, John R. Warner and Howard Freyensee. Mr. Studley becomes vice president, finance, and retains his old post of treasurer. He succeeds Frederick C. Weiblen, who is retiring. Mr. Warner was named vice president in charge of purchasing. Mr. Freyensee has been appointed manager of large excavator sales, succeeding L. C. Black, who was recently named manager of domestic sales.

In another announcement the firm told of the recent dedication and reception at its new Guelph, Ontario, operation. The plant and the five excavator models to be made there were shown to 500 guests. Shovel-cranes with capacities of ⅜ to 1½ cu. yd. will be made at the plant, as will a hydraulic crane-excavator.

(Continued on page 182)



Synchronous motor controllers are available in ratings up to 1750 hp at 2400 volts, 3000 hp at 4800 volts.

Here's synchronous motor control matched to grinding mill requirements

DESIGN of proper control requires a knowledge of both motor and driven machine. Allis-Chalmers designs and builds both grinding mills and synchronous motors. Who, then, is in a better position to design control for grinding mill applications?

When you specify Allis-Chalmers, you can be sure the control circuit is designed to reduce costly down time. Mill-matching is the answer to difficult starting, acceleration, synchronization, and motor protection problems.

For more information about Allis-Chalmers synchronous motor control for any grinding mill application, call your nearby A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Features

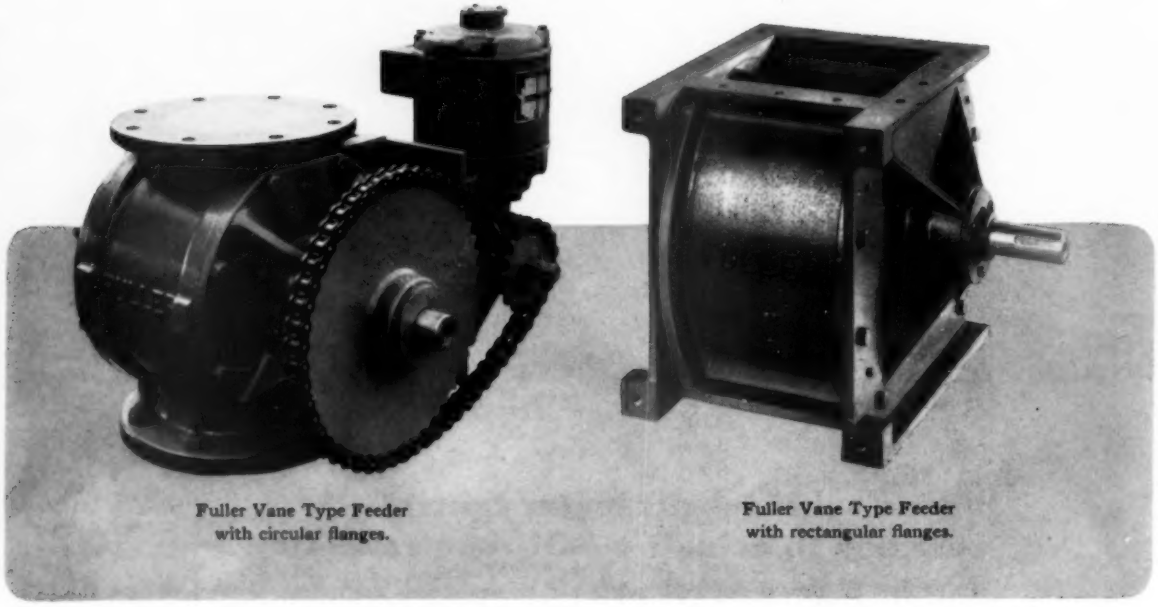
- Current limiting fuses clear short circuit in less than ½ cycle.
- Polarized automatic field application and field failure current relay provide complete field protection.
- Temperature compensated overload relay assures adequate stator protection.
- Instantaneous or time delay undervoltage protection available.
- Automatic inching available for quick, accurate, convenient spotting.
- Enclosures: NEMA 1 gasketed or NEMA 5 dust-tight.

ALLIS-CHALMERS

A-5763

Fuller Feeders Keep Conveyors Flowing Freely

. . . whether the load is a few pounds a minute or many tons an hour



Fuller Vane Type Feeder with circular flanges.

Fuller Vane Type Feeder with rectangular flanges.

Fuller Vane Type Feeders assure you of dependable handling of dry, pulverized and granular materials. They're available in capacity ranges to meet all normal plant requirements, and are built with circular or rectangular outlets. Check these Fuller cost-saving features . . .

Extra-rugged construction. Heavy, cast iron body walls and headplates add rigidity, longer life. Stainless or other metals can be used where sanitary or corrosion requirements demand their use.

Sealed bearings are equipped with Alemite fittings for ease of lubrication and long life. Abrasive particles can't enter, maintenance is cut.

Make effective air locks. Fuller Vane Type Feeders can be used as air locks for pressure differentials up to 3½ lbs.

Stuffing boxes and ball bearings for vacuum, low-pressure and general applications.

And, where extreme volumetric accuracy without pulsation is needed, there's a line of Fuller Roll Type Feeders. For full details on Fuller Feeders write for Bulletin.

See Chemical Engineering Catalog for details and specifications . 1306 F-20

FULLER COMPANY GENERAL AMERICAN TRADE MARK

Fuller

. . . . pioneers in harnessing AIR

FULLER COMPANY
102 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle

Enter 1093 on Reader Card

2-yd Loader Averages 2,700 yd Per Day for 5 Months on 2½-Million-yd Borrow Job

JOB: Relocation of Route 5 from Longmeadow, Massachusetts, to state line of Connecticut. 2½ million yards of borrow. Started last summer.

REPORT: — "Everyone in the area, it seems, who owns a shovel and a couple of trucks, is hauling on this job," says an on-the-spot reporter.

"The center of attraction, though, is the 2-yd TL-20 TRACTOLOADER* owned by Enfield Road Construction Company, Enfield, Connecticut. It sure is building a reputation for itself.

"It fills a 12-yd truck every 3½ minutes. Averages 2,700 yd in a 10-hour day. It can be, and has been, pushed to 3,000 yd."

One of the reasons for this fast loading is Tractomotive's *exclusive* ONE-LEVER control of speed and direction. Operator goes into and out of any forward or reverse gear while moving—always works at highest possible speed.

Some of the other reasons for the TL-20's outstanding performance include: LONGER REACH — you dump loads right into center of high truck bodies. GREATER STABILITY — more operating comfort, less spillage. STRONG, PIN-CONNECTED AXLES — no rolling and shifting under load.

See how the TL-20 can increase your production. Your ALLIS-CHALMERS dealer will be glad to show you.

*TRACTOLOADER is a registered Tractomotive trademark.

ALL TRACTOMOTIVE EQUIPMENT IS SOLD AND SERVICED BY YOUR ALLIS-CHALMERS DEALER

TRACTO—
a sure sign
of modern design

TRACTOMOTIVE
TRACTOMOTIVE CORPORATION • DEERFIELD, ILLINOIS

TRACTOLOADERS • TRACTOSHOVELS • TRACTORIPPERS • TRACTOHOES • TRACTOSIDEBOOMS

Enter 1056 on Reader Card

MANUFACTURERS NEWS

(Continued from page 178)

Jones, Hall of IH promoted

C. E. "SKIP" JONES is new manager of engine sales of the construction equipment division of International Harvester Co., Chicago, Ill. The growth of Harvester's engine sales prompted the firm to create a new post of engine sales manager, reported C. A. Hubert, manager of the construction equipment division.

Mr. Jones joined IH in 1936. His most recent post with the firm was divisional supervisor of sales engineering and sales development. Willard F. Hall has been named assistant sales manager of the division. Central region sales manager for the past three years, Mr. Hall has held several sales and service posts since joining the firm in 1939.

Insley shows new models at open house

INSLEY MANUFACTURING CORP., Indianapolis, Ind., showed its line of excavators and cranes to distributors and customers in December. Hit of the show, the firm reports, was its new 45-ton truck crane mounted on an Insley 4-axle truck. This and other new products give the firm a line of cranes from 5 to 45-ton capacity, and ½ to 1¼-cu. yd. excavators.

Sales manager

ROBERT G. BURSON has been appointed general sales manager of the Mechanical Goods Division of The Dayton Rubber Co., Dayton, Ohio, succeeding L. C. Strobeck, who retired after 29 years of service. Mr. Burson joined the company in 1956 as sales manager, Industrial V-Belt Division.

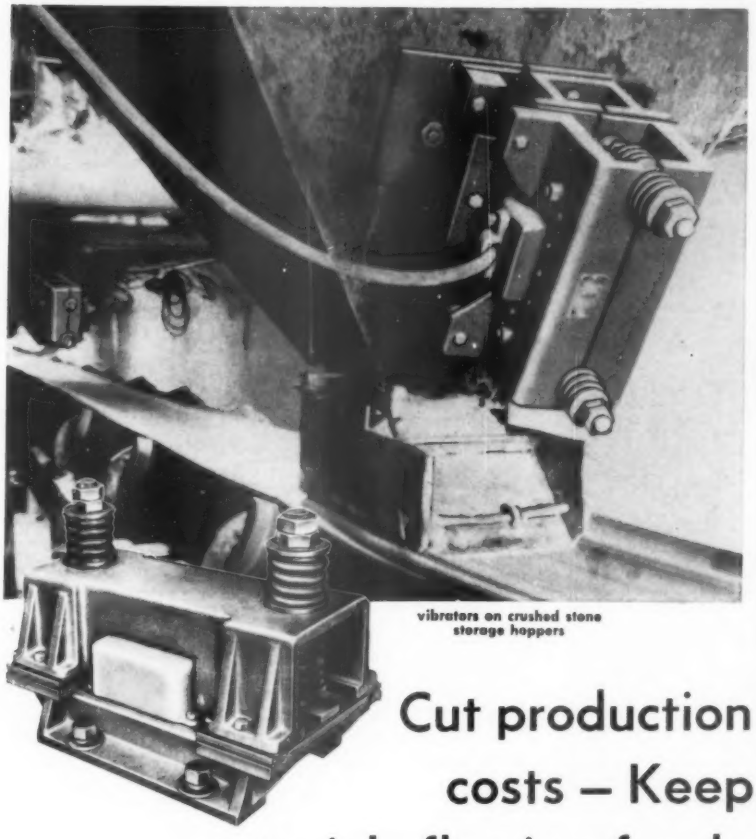
Mr. Strobeck had been vice president in charge of mechanical goods sales for Dayton since 1948 and considers his retirement a "semi-retirement" since he has established offices in Dallas, Texas, where he continues to do special staff and sales development work for Dayton.

Cohn becomes technical VP

NATHAN COHN, formerly manager of the market development at Leeds & Northrup, Inc., Philadelphia, Pa., is new vice president—technical affairs, in charge of development, engineering and patent departments. Raymond C. Machler is new director of research and development, G. Lupton Broomell is director of engineering and J. Clarence Peters is manager, patent division. Mr. Cohn has also been made a member of the management committee.

(Continued on page 186)

SYNTRON Pulsating Magnet
BIN VIBRATORS



vibrators on crushed stone storage hoppers

Cut production costs – Keep materials flowing freely

SYNTRON Electromagnetic Bin Vibrators set up waves of powerful, instantly controllable vibrations, 3600 per minute, to move even the most stubborn materials.

SYNTRON Bin Vibrators offer the most efficient and effective method of keeping sand, gravel, and even heavy rock and stone from plugging bins, hoppers and chutes. They eliminate damaging pounding and rodding.

Simplicity of design eliminates mechanical wearing parts and offers dependability of operation with low maintenance.

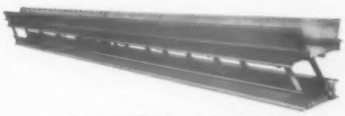
SYNTRON Bin Vibrators are available in sizes for every bin or hopper. Easy to install, easy to operate, easy to maintain.

If your production is being slowed by materials plugging in bins, hoppers or chutes call SYNTRON

Write for complete catalog data—FREE

Other SYNTRON Equipment of proven dependable Quality

PACKERS & JOLTERS



COUNTER BALANCED VIBRATING CONVEYORS

CAR SHAKERS

DRY FEEDER MACHINES

TEST SIEVE SHAKERS

SYNTRON COMPANY
450 Lexington Ave. Homer City, Penna.

Enter 1071 on Reader Card

USERS OF **NEW**
ROEBLING HERRINGBONE* WIRE ROPE
HOLD THESE TRUTHS TO BE SELF-EVIDENT...

That Herringbone is the most practical and *needed* wire rope development to come along in years.

Herringbone, the regular lay and Lang lay rope, is actually two-ropes-in-one rope. Thus, the qualities that make these two ropes *good* ropes, combine to make Herringbone *excellent*.

HERE'S WHY:

The steel core of Herringbone provides the *ideal* support for the two pairs of Lang lay and one pair of regular lay strands used in its construction. In addition, the outer wires are heavier for extra abrasion resistance, and good flexibility is maintained by the finer wires inside. This combination of features enables Herringbone to give *longer service* in most applications.

Herringbone has been used on a wide variety of excavating equipment and tough hoisting jobs with impressive results. Its applications are practically unlimited on installations which call for all-steel ropes and on many where fiber core ropes are now being used. Another of Herringbone's added attractions is the fact that it eliminates the necessity for stocking Lang lay rope for one job and regular lay for another.

Your Roebling Distributor has Herringbone right now. He has, also, copies of a brochure describing Herringbone, the newest Roebling Star Performer. If you wish, write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, for literature and anything you'd like to know about Herringbone.

*Reg. App. For

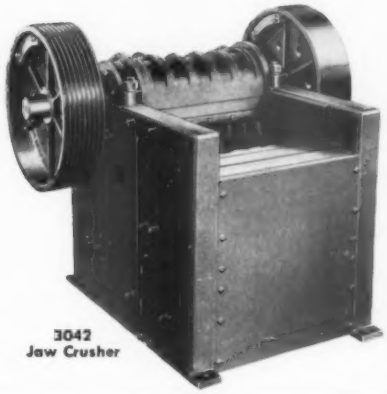
ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

HERRINGBONE
WIRE ROPE

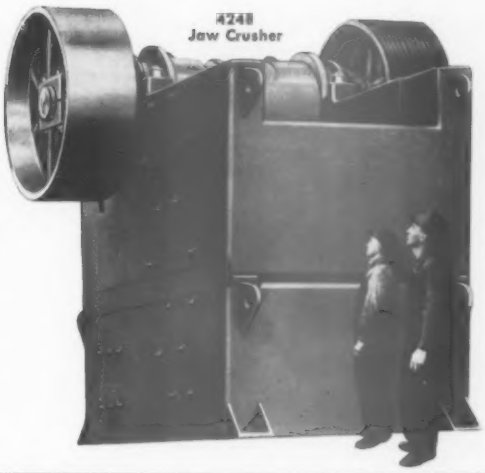
Enter 1100 on Reader Card

JAW CRUSHERS



3042
Jaw Crusher

PIONEER overhead eccentric action offers a double-action crushing stroke. This provides forced feed and greater capacity. Shaft bearings at each end are placed closer together than on any other crusher you can buy, thus greatly reducing shaft strain. Double-walled, welded steel base reduces weight while increasing strength. Jaw plates are reversible for double manganese use. Crusher can be adjusted while in operation. 12 sizes from 1016 to 4248.

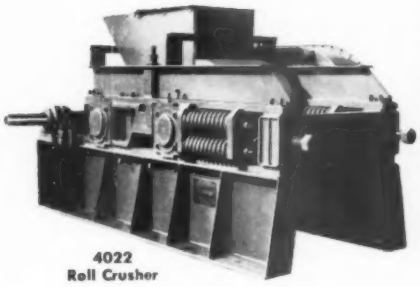


4248
Jaw Crusher

For men who like to underbid their competitors (and make a nice profit, too!)

Pioneer® Crushers

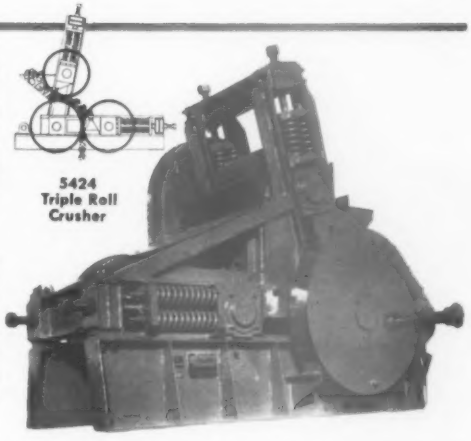
ROLL CRUSHERS



4022
Roll Crusher

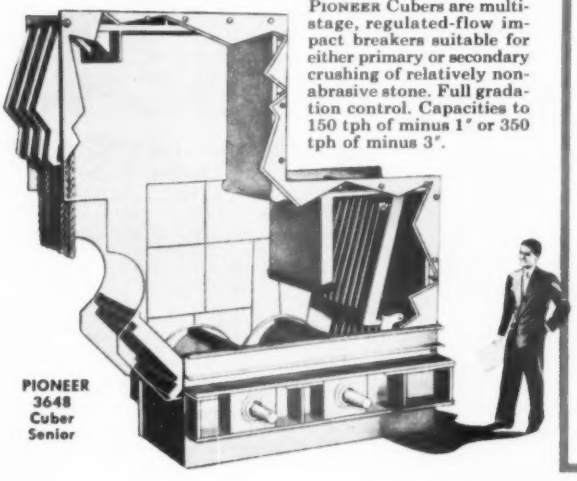
TWIN ROLL CRUSHERS. PIONEER design makes 100% of roll shell available as crushing surface with resultant savings in manganese. Shells are easily replaced without removing bearings from shaft. Driven by PIONEER-developed star gears fully enclosed and running in oil. Sizes: 2416, 3018, 3024, 4022, 4030 and 5424.

TRIPLE ROLL CRUSHER. Add a third roll and you have a Triple Roll Crusher. This makes it possible to increase stage of reduction to as much as 6½". Triple Roll Crushers are manufactured only by PIONEER. They are available in 3018, 4022 and 5424 sizes.



5424
Triple Roll
Crusher

IMPACT BREAKER



PIONEER
3648
Cuber
Senior

PIONEER Cubers are multi-stage, regulated-flow impact breakers suitable for either primary or secondary crushing of relatively non-abrasive stone. Full gradation control. Capacities to 150 tph of minus 1" or 350 tph of minus 3".

For your free copy of *FACTS AND FIGURES* (the most complete and comprehensive handbook for the aggregates-producing industry), write to Pioneer Engineering, Minneapolis 14, Minnesota, or contact your Pioneer Distributor.

Pioneer®
ENGINEERING
DIVISION OF POOR & COMPANY, INC.
MINNEAPOLIS 14, MINNESOTA

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MANUFACTURERS NEWS

(Continued from page 182)

Knox heads Research-Cottrell

JAMES M. KNOX has been elected president of Research-Cottrell, Inc., Bound Brook, N.J., maker of gas cleaning and handling equipment. Retiring President Carl W. Hedberg continues as a director of both this firm and its parent, Research Corp., New York City.

Mr. Knox, a director of Research-Cottrell, was assistant director and business manager of the Brookhaven National Laboratory prior to joining Research Corp. as financial vice president in 1951.

Mulcahy joins WEMCO

P. H. MULCAHY has been named general manager of WEMCO, a division of the Western Machinery Co., San Francisco, Calif. Previous to joining the firm, Mr. Mulcahy was vice president and general manager of the Rietz Manufacturing Co., Santa Rosa, Calif., and West Chester, Pa. WEMCO makes mining, sand and gravel processing and other industrial equipment.

Bond promoted at Nordberg

JACK E. BOND has been named general manager of the mining, crushing and process machinery division of Nordberg Manufacturing Co., Milwaukee, Wis. He succeeds D. A. Cheyette, a vice president, who becomes executive director of the division. Mr. Bond was assistant manager of the division, a post which now goes to Robert C. Meaders. Mr. Meaders was vice president of Aerofall Mills, Inc.

Paul J. Louzecky, who has been chief technical engineer for the Cleveland Diesel Engine Division of General Motors Corp., Cleveland, Ohio, was appointed chief engineer of the Nordberg division. Emil Grieshaber, former chief engineer, will continue as consultant.

Lehmkuhl heads Arcair sales

ELMER LEHMKUHL has been appointed sales manager of Arcair Co., Lancaster, Ohio. The firm also announced that Martin Boyer is new sales promotion, advertising head.

Hercules to market German-built engines

HERCULES MOTORS CORP., Canton, Ohio, has acquired sole distribution rights to the German-built "Jlo" line of air-cooled diesel and gasoline industrial engines within the continental limits of the United States. The engines can be used in industrial, agricultural and construction equipment. Complete service and parts will be maintained through Hercules' network of 76 U. S. distributors.

(Continued on page 190)

THE 40-R

Ability to handle the most punishing work and be ready when you need it makes the BUCYRUS-ERIE 40-R the most outstanding rotary drill on the market, under all drilling conditions

In Granite-Hard Formations operator can exert maximum down pressure on the bit for most effective penetration.

In Soft Formations operator increases rotating speed, eases the down pressure and keeps air velocity high so that the bit will not be buried or choked in cuttings.

In Fissured Formations the 40-R instantly adapts to each new set of conditions without stopping the operation.

For illustrated bulletins on the 40-R (diesel or electric for drilling 6¾ to 9-in. holes) or the 50-R (full electric for drilling 9⅞ to 12¼-in holes) write Dept. 1B59A, Bucyrus-Erie Company, Drill Division, Richmond, Indiana.

BUCYRUS ERIE®

Builds Better Equipment

The Standard of Comparison for GRINDING ECONOMY

Sheffield alloying, forging and heat treating techniques assure the right combination of hardness and toughness—right to the core of the ball. Result: longer service life, less down-time, greater production economies. Something to remember next time you order grinding balls.

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

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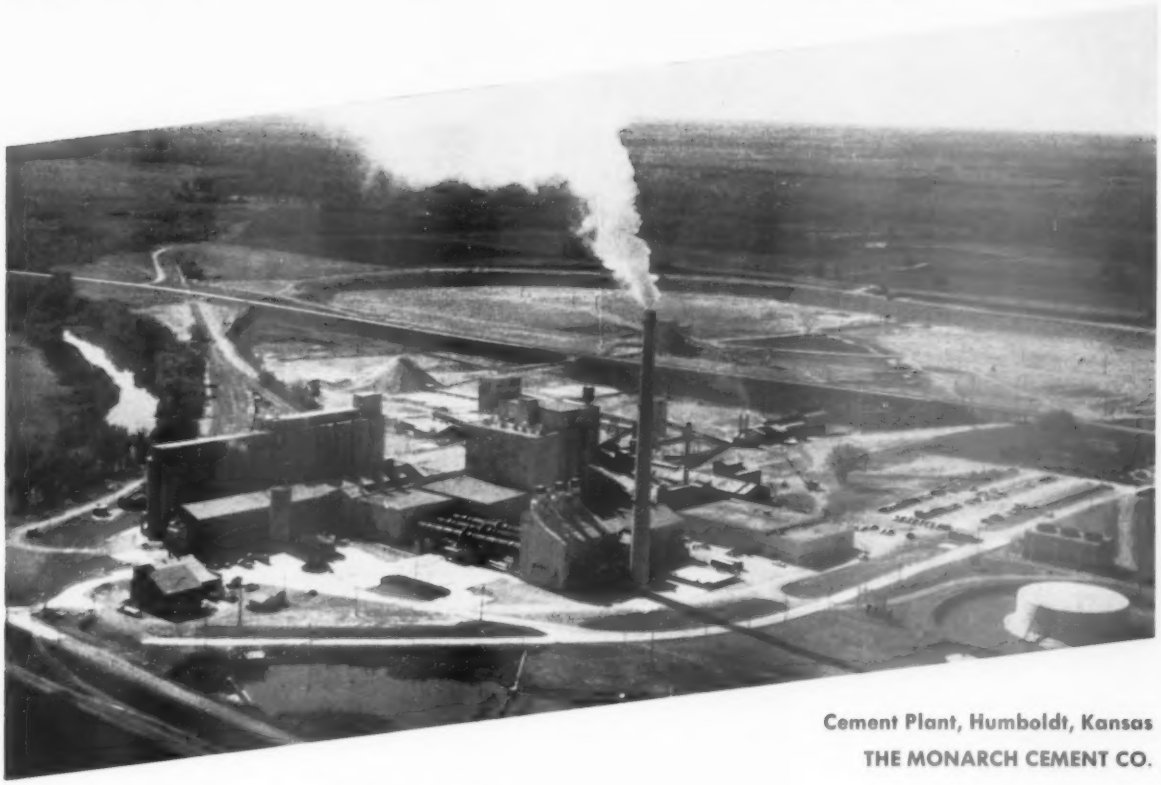
"A modern, versatile Monarch"

MACDONALD

A Complete Service



Cement Plant, Humboldt, Kansas
THE MONARCH CEMENT CO.

- LAYOUT
- DESIGN
- CONSTRUCTION

MACDONALD ENGINEERING CO.

CONSTRUCTING ENGINEERS

885 Bryant Street
San Francisco, Calif.

22 West Madison St., Chicago

2349 Yonge St.
Toronto, Canada

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(Continued from page 186)

Fuller opens N.Y. office

FULLER Co., subsidiary of General American Transportation Corp., Catasauqua, Pa., has opened a New York district office to give customers in that area quicker service. The new office is managed by Andrew van der Lyn, who has had sales experience with Pangborn Corp., the Day Co. and Pittsburgh Lectrodryer Division of McGraw Edison Co. Fuller makes air conveyors and other equipment.

B. B. Spratling

M. J. Yost

W. M. Vollendorf

R. C. Loman

Chrysler Marine names four to new posts

BRUCE B. SPRATLING, M. J. Yost, William M. Vollendorf and Robert C. Loman have been named to new positions with the Marine and Industrial Engine Division of Chrysler Corp., Trenton, Mich. Mr. Spratling was named product sales manager; he joined the division several months ago as parts sales manager. He previously was with another engine maker as market research manager.

Mr. Yost, with the firm 31 years, was named manager of field operations. He has served as division west coast sales manager and sales manager. Mr. Vollendorf, new division advertising and sales promotion manager, has managed exhibits and coordinated advertising and public relations in his eight years with the division. Mr. Loman, new manager of parts and service, had been assistant regional service manager of the Dodge Division.

New Air Reduction department

A SPECIAL PRODUCTS DEPARTMENT has been established by Air Reduction Co., New York City, with Charles I. MacGuffie as manager. J. N. Berryman is general sales manager of the new department. The firm, producer of industrial gases and welding and cutting equipment, formed the department to speed the development of such ideas as its fusion welding processes. Mr. MacGuffie was manager of marketing for the machine welding department of General Electric Co.

New HMS magnetite firm

A NEW PROCESSOR OF MAGNETITE for the heavy media separation process, Mineral Mills, Inc., has been established with headquarters and plant in Pittsburgh, Pa. Earl C. Payne, for many years consulting engineer with Consolidation Coal Co., is president. Magnetite is the "heavy media" used to clean gravel, gypsum, coal and other minerals in the heavy media separation and washing process. Mineral Mills has acquired the magnetite operations previously owned by Orefraction, Inc., of Pittsburgh.

(Continued on page 192)

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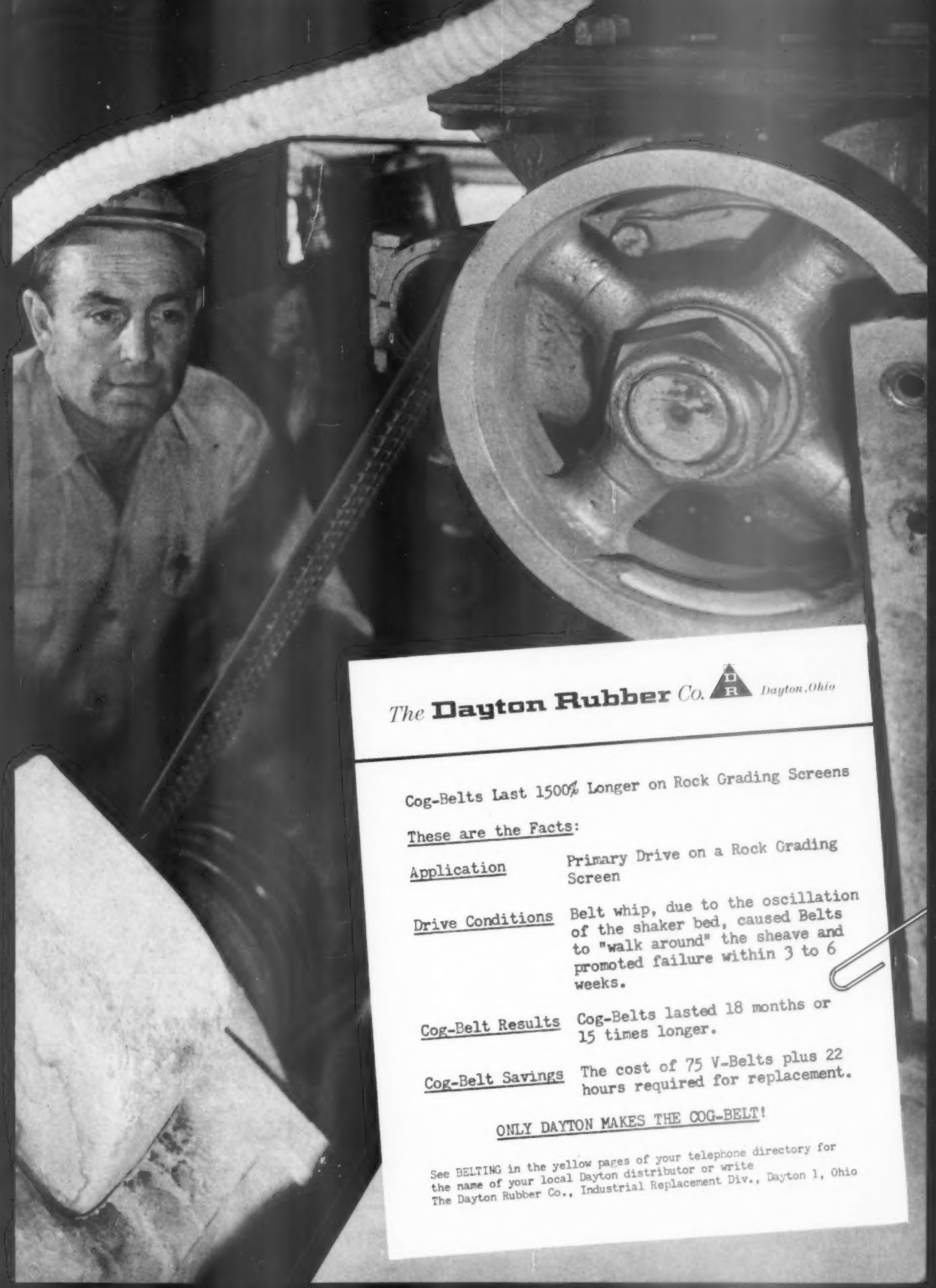


The **Dayton Rubber** *Co.* D R *Dayton, Ohio*

Cog-Belts Last 1500% Longer on Rock Grading Screens

These are the Facts:

Application	Primary Drive on a Rock Grading Screen
Drive Conditions	Belt whip, due to the oscillation of the shaker bed, caused Belts to "walk around" the sheave and promoted failure within 3 to 6 weeks.
Cog-Belt Results	Cog-Belts lasted 18 months or 15 times longer.
Cog-Belt Savings	The cost of 75 V-Belts plus 22 hours required for replacement.

ONLY DAYTON MAKES THE COG-BELT!

See BELTING in the yellow pages of your telephone directory for the name of your local Dayton distributor or write The Dayton Rubber Co., Industrial Replacement Div., Dayton 1, Ohio

MANUFACTURERS NEWS

(Continued from page 190)

Gardner-Denver gets Mayhew

PLANS FOR COMBINING Mayhew Machine Co., Dallas, Tex., and its sales company, Mayhew Supply Co., Inc., with Gardner-Denver Co., Quincy, Ill., were announced recently.

Mayhew Machine makes rotary drilling equipment for the construction and mining industries, and oil well drilling and exploration equipment. Gardner-Denver makes drill rigs, drill steel, air compressors and other equipment for the rock and other industries. Gardner-Denver has about 4,000 employes, Mayhew, about 200.

Butler names Stewart, Colvin

JAMES A. STEWART AND RICHARD O. COLVIN have been named bulk storage and handling equipment specialists for Butler Manufacturing Co., Kansas City, Mo. The two will handle sales of galvanized and coated steel tanks for dry granular materials such as sugar, chemicals and plastics. Mr. Stewart will handle sales to firms east of the Mississippi, and Mr. Colvin, those west of the river.

Paul McAdams

Clark Equipment promotions

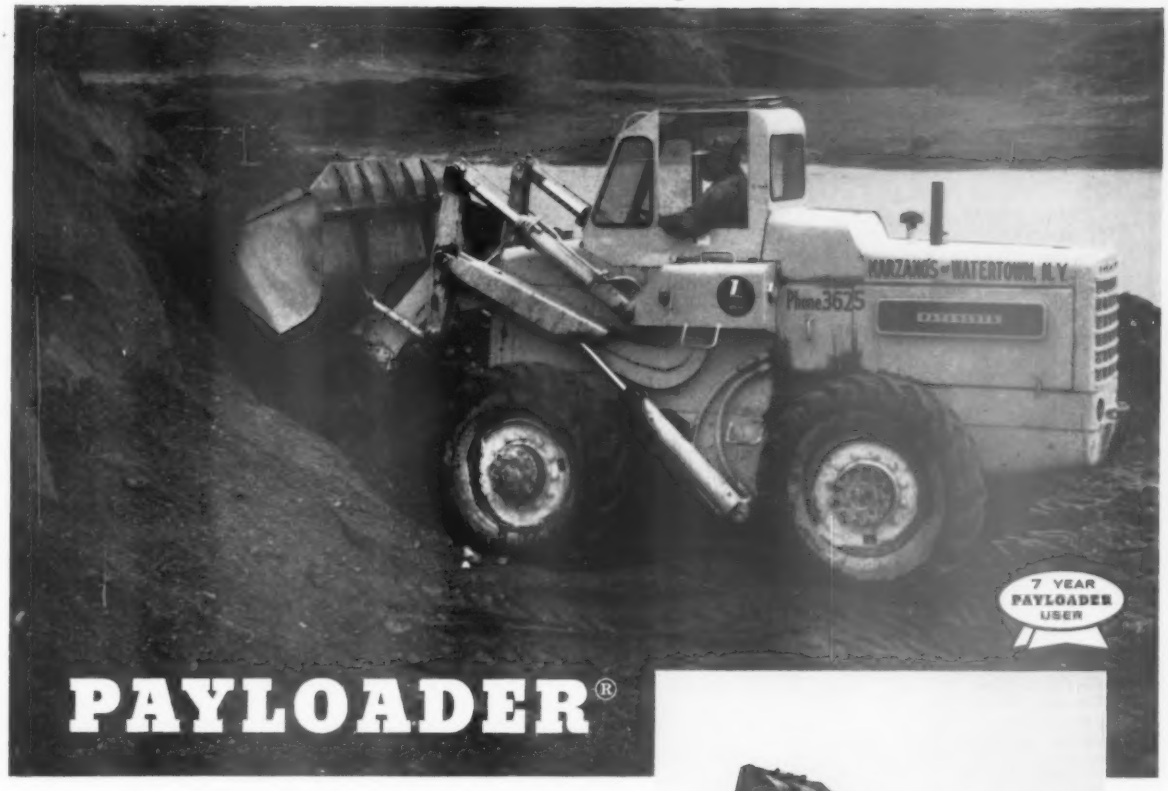
B. FRANK REACH, JR., is new manager of the central district for the construction machinery division of Clark Equipment Co., Benton Harbor, Mich. Others promoted are Paul McAdams, new chief engineer of the division and Gust J. Schwanke, who becomes manager of parts and service. Mr. Reach, formerly a central district representative, joined the firm in 1953. Mr. McAdams, formerly development engineer, worked as an engineer and superintendent with R. G. LeTourneau before coming to Clark in 1954. Mr. Schwanke has been with the firm 16 years. Past positions include pattern supervisor, expeditor and assistant manager of parts and service.

Ross to make belt idlers

THE ROSS PORTA-PLANT CO., Brownwood, Tex., makers of portable concrete batching plants and bulk cement plants, announced that it will soon be making a line of belt idlers. The firm completed plans to purchase the belt idler division of Acme Iron Works Co., San Antonio, Tex., and will move the idler operation to its Brownwood plant.

Laws is Baker sales manager

ROBERT J. LAWS is new general sales manager of Baker Industrial Trucks Division, Otis Elevator Co., Cleveland, Ohio. The appointment filled a vacancy left with the resignation of R. T. Tiebout. Mr. Laws joined the firm in 1955. END



PAYLOADER®

...speeds bank loading 50%

"Every time our HU 'PAYLOADER' leaves the pit to do other work, our operation is really handicapped . . . we've grown to depend on it for *all our pit work!*"

That's the reason "PAYLOADER" equipment is a *"must"* at the Marzano sand and gravel operation at Watertown, New York. They used their first Hough (Model HM) for more than 6 years with outstanding dependability. Now, they say, "the easily operated Model HU, with new design breakout action, has speeded-up our bank loading operations 50% or better over the old type Hough machine. It's the most versatile machine ever on the job" . . . besides doing a variety of lugging and maintenance work, the fast-moving "PAYLOADER" moves about one-fourth of their annual production.

Any 4-wheel-drive "PAYLOADER" gives you *more* machine for your dollar investment. Its unique bucket action goes in fast and smooth and brings out heaped loads without excess spillage; power-transfer differentials, plus heavy-duty axles assure reliable traction on mud, gravel, ice and snow and more digging power; power-shift transmission, power steering and 4-wheel power brakes are other outstanding features.

There is a Hough Distributor near you that is ready to prove the superior performance of a "PAYLOADER" tractor-shovel *on your work!* Call him today for a demonstration.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

A "PAYLOADER" is an operator's machine — handles easily, has good brakes, plenty of power and excellent balance . . . outperforms any other loader in its size class.

THE FRANK G. HOUGH CO.
705 Sunnyside Ave., Libertyville, Ill.

Please send complete data on 4-wheel-drive "PAYLOADER" tractor-shovels:

☐ **Model HO — 9,000-lb. carry capacity**
☐ **Model H-70 — 7,000-lb. carry capacity**
☐ **Model HU — 5,000-lb. carry capacity**

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Title.....
Company.....
Street.....
City.....State.....
1-B-5

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Rock Products Classified Advertising
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Forms close 12th of Month Preceding Publication

Mail to: **ROCK PRODUCTS**, Where To Buy Dept., 79 West Monroe St., Chicago 3, Illinois

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Remittance Enclosed
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9-14	8.40
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Lower rates on a contract basis. Write for rate card.

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Box Numbers will be assigned to ads without extra charge, if the advertiser desires. Inquiries should be sent to the Box Number c/o Rock Products, 79 W. Monroe St., Chicago 3, Ill. They are forwarded daily to the advertiser. Rock Products cannot disclose advertisers' name or answer inquiries.

CRUSHERS

CONE, Symons 7' Super Standard
CONE, Symons 3', Portable
GYRATORY, Kennedy, 49, 38½, 37½
JAW, Mitchell, 18" x 9", 25 HP
JAW, Bacon 11" x 15"
DOUBLE ROLL, Gruendler, 24" x 24", 20 HP
RING ROLL, Sturtevant, 14" x 9½"
BABCOCK & WILCOX Type E32, 75 HP
RAYMOND, 6 Roll, Low Side, 200 HP
RAYMOND, 3 Roll, #3036 hi-side
HAMMERMILL, PENNA. CRUSHER #5060, Series #DNC, 400 HP, non-clog, 1952—UNUSED.

DRYERS & KILNS

11' x 155' Traylor Kiln, ¾", Shell.
9' x 100' Kiln, 2-tire Vulcan
8' x 170' kilns.
8' x 125' Vulcan Kiln, ¾" shell
8' x 115' Long—½" shell, 2 tires.
8' x 50' Traylor Kiln
7' x 6" x 100' Kiln, ½" shell
6' x 60' Vulcan Kiln, ⅜"
8' dia. x 70' L, Ruggles Coles, Double. Shell, Indirect-Direct heat, ½" shell.
5'6" dia. x 50', Renneburg, ⅜" shell.
6' x 50', Louisville, Steam Tube.
5'6" x 30', ⅜" thick Shell.
4'8" x 33', ⅜" thick Shell.
4' x 24' L, 5 HP, brick lined kiln.

MILLS

CONICAL BALL, Hardinge 4'6" x 16", 25 HP
COMPEB, Allis Ch., 7' x 24', 450 HP
BALL, Scrubber, Hardinge 8' x 48"
BALL, Denver 4' x 10', 60 HP
Ball, Allis 6' x 15', 150 HP
BALL, Marcy No. 64½, 125 HP
ROD, Marcy 7' x 15', 300 HP (4" liners)
Ball, Kennedy 3' x 6', 50 HP

MISCELLANEOUS

BRIQUETTING PRESSES, Komarek Greaves, 75 HP, 50 HP, 10 HP
PUG MILLS, 25, 50, 150 HP
STEEL BINS—up to 200 tons storage, all welded construction
5000'—All steel through belt conveyor, 16" & 24" rubber belts
ALSO—Steel Trough—Belt Conveyors, Bucket Elevators, Steel Screw & Flight Conveyor, etc.

PERRY EQUIPMENT CORPORATION
1418 N. Sixth St. Phila. 22, Pa.
POplar 3-3505

LIQUIDATION
TITANIUM DIOXIDE PLANT

Broening Highway - Baltimore, Md.
Telephone: MEdford 3-2911

1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, ⅞" shell.

1—Vulcan 8' x 125' Rotary Kiln, 2 tires, ¾" shell.

2—Vulcan 8' x 50' Rotary Kilns, 2 tires, welded, ⅞" shell.

2—Vulcan 6' x 60' Rotary Kilns, 2 tires, ¾" shell.

1—Traylor 5' x 50' Rotary Dryer, 2 tires, welded.

2—Abbe 5' x 16' Ball Mills.

4—Mikro Pulverizers, 3TH, 2TH.

5—Worthington, I.R., Compressors; 1000, 500 & 300 cfm.

2—Aurora 24" Vertical Centrifugal Pumps, 200 HP motors, 5000 gpm, 125' head.

1—Byron Jackson Deep Well Pump, 75 HP Vertical Motor.

8—Dorr Thickener Mechanisms; 50', 40', and 16'.

Steel Buildings; 20 ton Overhead Cranes; Bemis 50 lb. Bag Packer with Sewing Machine; Bucket Elevators 65 to 125 ft. high; Redler Conveyors 5" and 10"; Screw Conveyors 6" and 9", etc.

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BRILL EQUIPMENT COMPANY
2401 Third Avenue, New York 51, N.Y.
Tel: CYpress 2-5703

FOR SALE

650-B Bucyrus Erie Elec. Drag, 195', 16 yd.
15-W Bucyrus-Erie Elec. Drag, 215', 13 yd.
9-W Bucyrus Erie Diesel Drag, 165', 13 yd.
7400 Marion Diesel Drag, 175', 13 yd.
625 Page Diesel Drag, 150', 10 yd.
723 Page Diesel Drag, 130', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W Bucyrus Erie Diesel Drag, 125', 6 yd.
5-W Bucyrus Erie Diesel Drag, 100', 6 yd.
2400 Lima Dragline, 130', 5 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 yd. Elec. Shovel
750-B Bucyrus Erie 20 yd. Elec. Shovel
5480 Marion 18 yd. Elec. H.L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
120-B Bucyrus Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
111-M Marion Standard & H.L. Shovels
3500 Manitowoc Standard & H.L. Shovels
54-B Bucyrus Erie Standard & H.L. Shovels
Large selection of smaller Shovels and Draglines available
Model T-750 Reich Truck Mounted Rotary and Down-the Hole Drill
McCarthy & Compton Coal Auger Drills
Euclid Trucks, truck cranes, dozers, scrapers, front end loaders, attachments and other misc. equipment available.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

ELEC. AIR COMPRESSORS
1—3876', 1—1578' and 2—1098' Inger. Rand
DIESEL ELEC. LOCOMOTIVES
4—65 ton Whitcomb 2—25 ton & 1—70 Ton
2—45 ton & 1—80 ton & 4—100 ton Gen. Elec.
ROTARY DRYERS & KILNS
36" x 20', 5' x 25', 6' x 72', 9' x 125', 5'x35' Ruggles-Coles XA-8 Dbl. Shell, Comp.
33" x 18' Rotary Kiln W/Drive & Burner
REDUCTION MILLS & FEEDERS
5' x 22" Hardinge Ball W/Air Class. Comp.
4' x 8', 6'6" x 14'6" & 8'6" x 12' Rod Mills
5' x 10' Kennedy-Van Saun Rod Mill
1—5'x22" Hardinge Ball Mill with Air Classifying Equipment.
2—No. 77 & 1—96 Marcy Ball Mills
4½' Symons Std. Cone Crusher
30" x 42" & 24" x 36" Pioneer Jaw Crushers
30" x 36" & 36 x 42 Traylor Jaw Crushers
25B Telsmith Primary Breaker
36" Superior McCully Primary
20" x 36" & 24" x 36" Pioneer Jaw Crusher
14" & 28" New England Road Machinery
15x24 & 10x36 Cedar Rapids Jaw
3—200 HP & 160 HPSD. Ottumwa Elec. Hoists.
17 Speed Reducers 9.37 to 19.5 H.P.
VIBRATING SCREENS
5' x 12—3 Deck A.C. "Ripl-flo"
4 ELEC. WHIRLEY CRANES
2 Amer. R20-60 Ganty 139' Boom
15 ton AHGD 100' Boom Derrick

R. C. STANHOPE, INC.
60 E. 42nd St., N.Y. 17, N.Y.

BONDED QUALITY BARGAINS

NEW CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Remember, You Save Up To 60%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Ft.
14"	25'	$1397	$ 722	
14"	50'	2222	1144	$16.84
14"	85'	3377	1733	
16"	20'	1262	636	
16"	45'	2137	1058	
16"	60'	2662	1359	18.04
16"	90'	3712	1900	
18"	25'	1477	794	
18"	45'	2217	1166	
18"	70'	3142	1648	
18"	85'	3697	1923	19.24
18"	100'	4253	2220	
18"	130'	5362	2797	
20"	25'	1517	828	
20"	60'	2882	1533	
20"	75'	3467	1838	20.37
20"	90'	4052	2145	
24"	25'	1590	898	
24"	45'	2430	1330	
24"	70'	3480	1875	
24"	100'	4740	2514	21.78
24"	120'	5580	2950	
24"	150'	6840	3603	
30"	50'	2911	1617	
30"	70'	3871	2119	24.75
30"	90'	4831	2614	
36"	25'	1618	1118	
36"	45'	2858	1678	
36"	60'	3638	2096	27.95
36"	100'	5718	3214	

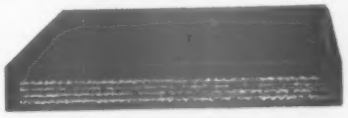
Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams, with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2⅞" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 60% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. WRITE FOR BULLETIN #1138.

Bonded troughing idler conveyors also available in Truss Frame Construction. WRITE FOR BULLETIN #1189 AND PRICES.

NEW CONVEYOR BELTING SAVE UP TO 34%

WE PAY FREIGHT ON 200 POUNDS OR OVER



QUALITY TESTED CONVEYOR BELTING*

Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price	Sale Price
14"	4	$8.68 ft.	$2.62 ft.
16"	4	4.08 ft.	2.77 ft.
18"	4	4.51 ft.	3.06 ft.
20"	4	4.97 ft.	3.54 ft.
24"	4	5.85 ft.	3.97 ft.
30"	4	7.18 ft.	4.85 ft.
36"	4	8.51 ft.	5.76 ft.

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price	Sale Price
14"	4	$ 4.81 ft.	$2.85 ft.
16"	4	4.85 ft.	3.22 ft.
18"	4	5.39 ft.	3.57 ft.
20"	4	5.90 ft.	4.07 ft.
24"	4	6.94 ft.	4.60 ft.
30"	4	8.53 ft.	5.66 ft.
36"	4	10.09 ft.	6.84 ft.
24"	5	8.14 ft.	5.38 ft.

*All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1388

BONDED® QUALITY BUILT BUCKET ELEVATORS

RIGID THRUOUT - MINIMUM VIBRATION AND NOISE

ENCLOSED ELEVATOR

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models are designed for low cost, high capacity elevating of practically all bulk materials. Open and other types priced on request. There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active.

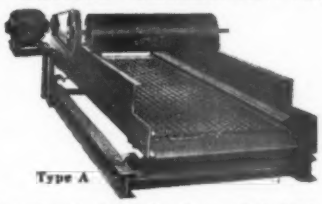
Prices listed at right are for Vertical Enclosed Elevators. Standard Elevators with Chain mounted buckets use #477 or #C102B combination chain. 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted Bucket Elevators.

Bonded Bucket Elevators are Jig Built to insure easy Job-Site Installation.

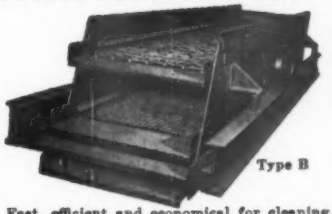
Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5x3½	$1071.50	$20.25
C64A	6x4	1088.50	21.00
C85A	8x5	1235.00	25.50
C106A	10x6	1281.00	27.50
C127A	12x7	1510.00	31.25
C148A	14x8	1673.50	36.00
Style "A" Spaced Malleable Buckets On Belt			
B53A	5x3½	$1099.00	$20.50
B64A	6x4	1116.50	21.25
B85A	8x5	1311.50	27.25
B106A	10x6	1692.50	33.00
B127A	12x7	1854.50	37.25
Style "E" Continuous Steel Buckets On Chain			
C85E	8x5x 7⅝	$1397.00	$31.25
C126E	12x6x11⅝	1599.00	34.25
C108E	10x8x11⅝	1604.00	34.75
C128E	12x8x11⅝	1624.00	35.50
C148E	14x8x11⅝	1710.00	36.75
Style "E" Continuous Steel Buckets On Belt			
B85E	8x5x 7⅝	$1727.50	$34.50
B116E	11x6x 8¾	1839.50	38.75
B128E	12x8x11⅝	2013.00	43.50

A complete line of parts and accessories available to build your own Bucket Elevators. Continuous Steel, Salem Steel and Malleable Iron Buckets available in a wide variety of sizes, shapes, gauges and styles at low prices. WRITE FOR BULLETIN #1203 AND PRICES DESCRIBING COMPLETE LINE OF BUCKET ELEVATORS AND BUCKETS.

BONDED® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS



Type A



Type B

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

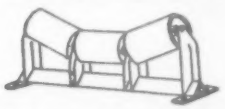
PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.

PRICED FROM $443

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST

PRICED FROM $1445

IDLERS AND RETURN ROLLS SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. WRITE FOR BULLETIN #1138.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — WRITE FOR FREE CATALOG AND PRICES — PHONE Evenings: AX. 1-2213, HU. 6-3156

128 Bellevue — Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders — COLUMBUS 7, OHIO

QUARRY EQUIPMENT

Cedarapids 3042 double impeller. Rebuilt
Cedarapids 3033 Hammermill new condition
Cedarapids 3033 Hammermill secondary plant on rubber.
Cedarapids 3036 Primary Crushing Plant
Telsmith 13 B gyratory crusher.
36" x 8'4" apron feeder with drive.
Robins 4' x 9' triple deck screen.
Syntron F45 vibrating grizzly feeder.
New Holland 4' x 12' double deck screen. Rebuilt
Pioneer 4' x 8' double deck screen. Rebuilt
27½ ton. single-compartment 8' x 12' bin.
1—Eagle 36" x 20' Double Log Washers. Good.
Wemco 24" x 13' Sand Preparation Machine.
60-ton. two-compartment, 8' x 18' storage bin with clam gates.
100-ton, two compartment, 13' x 29' bin
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also conveyor belting.

SHOVELS AND CRANES

Lorain L-830, 2-yd. Diesel Shovel-Crane.
P & H 855B-LC, 2-yd. diesel dragline.
P & H 655B1½ yd. diesel dragline reconditioned.
Lorain L-70, 1½-yd. diesel shovel rebuilt.
Bucyrus-Erie 38B, 1½-yd. Diesel Dragline.
Lorain L-41 ¾-yd. diesel backhoe reconditioned.
Lorain L-50K, 1-yd. Diesel Crane. Excellent.
Lorain L-26, ¾-yd. Diesel Dragline. Excellent.
2—Lorain L-26, ¾-yd. Diesel Backhoes.
Lima 34 Paymaster ¾-yard diesel shovel. Good
Unit 1030 ¾-yard diesel powered shovel-crane
Unit 614, ½-yd. Diesel Backhoe.
Lorain TL-20, ½-yd. Diesel Backhoe.
Lorain MC-414 20-ton Moto-Crane reconditioned.
Link Belt HC-90 25-ton truck crane
Wayne 50B, 25-ton truck crane. 18 mos. old.
Lorain MC-4 15-ton Moto-Crane.
Lorain SP-107, 7-ton self-propelled crane
Hough Hr, 1-yd. gas front end loader

TRACTORS, TRUCKS, SCRAPERS, ETC.

2—Euclid TS-18 twin engine scrapers.
4—Euclid 18-yd. overhung engine scrapers.
2—Euclid 12-yd. overhung engine scrapers.
3—Euclid 7-yd. overhung engine scraper.
1—Euclid 15½-yd. six wheel scrapers.
2—Euclid 13-yd. bottom dumps. Good.
2—Euclid TC-12 twin engine tractors.
1—Euclid 18FD, 15-ton rear dump.
1—Mack LRS 15-ton rear dump. Rebuilt
1—Pullman S-600. 6 to 8 yard scraper.
1—Caterpillar DW-10 hydraulic scraper.
1—International TD-14A tractor with PCU
1—International TD 18 with cable bulldozer
1—Euclid tractor with 3200 gallon water tank
1—Cat. D-7 with Hydraulic Angledoser Blade.
1—Cat. D-6 with hydraulic angledoser blade.
1—Caterpillar D-4 Tractor only
1—Internat'l. 300 tractor, with loader backhoe.
1—Allis-Chalmers HD-19 with cable bulldozer
1—LaPlante choate 13½-yd. Cable scraper
1—Atco H85, 10½-yd. Hydraulic scraper

SHOVEL ATTACHMENTS

Lorain 82 or 820, 2-yd. 23' boom, 20' stick
Lorain 50, 1-yd., 21' boom, 17' stick
Lorain 30A, ½-yd., 16' boom, 13'4" stick.
Osgood 903, 2-yd., 24' boom, 20'6" stick.

BACKHOE ATTACHMENTS

Lorain 40A, 18' boom, 7' stick, 28", 36" or 44" bucket.
Koehring 304, 19' boom, 5' stick.

DIESEL POWER UNITS

Cat. D7700, 74 H.P. at 1000 RPM. Rebuilt
Cat. D8800, 88 H.P. at 1000 RPM.
Cat. D13000, 128 H.P. at 1000 RPM. Rebuilt.
GM 3021C, 3-cylinder. new.
GM 671, 6-cylinder, rebuilt.
GM Twin Diesel, rebuilt.

AIR COMPRESSORS

105 cu. ft. LeRoi tractair with dozer, backhoe
3—125 cu. ft. Gardner-Denver Gas Portables.
126 cu. ft. Jaeger gas portable.
210 cu. ft. Schramm gas portable.
210 cu. ft. Schramm Diesel Portable.
315 cu. ft. Schramm gas portable.
500 cu. ft. Ingersoll-Rand. Waukesha power
4—600 cu. ft. Gardner-Denver diesel portables.

L. B. SMITH, INC.
Camp Hill, Pa.
Phone Harrisburg REgent 7-3431

SPECIAL ITEMS

C-R 5530 Twin roll, 200 HP elec. motor.
Iowa 53"x60" dbl. Impact hammermill
Traylor 56"x72" sectional frame jaw crusher
Traylor 4' Model TY crusher. Numerous spare parts.
Pennsylvania Trojan heavy duty hammermill Size C-3-30 mang. steel hammers. 50 TPH ⅝"
Symons 4' short head coarse bowl cone crusher.

CONCRETE MIXERS

Ransome Model 848, 3 yd. tilting type
Smith 422, 4 yd. tilting type
Koehring 568 2 yd non tilting type

TRUCKS—TRANSIT MIXERS

15 Ford F8-6 yd. end dump. Excel. Reinforced, 1955
10 Mack LRSW 32 ton rear dump trucks Cummins NHIRS-600 300 HP Diesel Motor Allison converter-transmission.
6 Euclid 36 TD end dumps 300 HP Cummins Diesel
10 Euclid 28 FD rear dumps 15 ton cap. Cummins Diesel.
6 Smith tan. ax. Diesel, 1953, 5½ yd. mixing
4 Smith tan. ax. 4½ yd. mixing

CRUSHERS—KILNS—DRYERS

JAW: Acme 10x20, 15x36, 14x26, 14x28, 10x42, 16x32, 18x32, 22x40. Eagle 10x16, 20x36. Diamond 24x36". Cedar Rapids 10x20, 15x36, 20x36, 25x40. Farrell 10x20, 18x30, 14x36, 18x36, 36x48. Buchanan Type C 30x42, 36x42. Traylor 18x36, 24x36. Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Universal 18x24.
GYRATORY: Al-Chal 6, 7½, 8, 9, 10, 12, 16, 18, 20". Telsmith TY 4', 3' Gyrosphere
25B Kennedy Van Saun 12, 37½, 38, 49½"
ROLL: Cedar Rapids 40x20, Pioneer 40x22, 30x18, 54x24 triple roll; Telsmith 24x16.
HAMMERMILL: Jeffrey Type B3 24x20, Type B 36x24, 36x36, 36x42, Eagle 24x24, Stedman 24x30, 36", 42". Cedar Rapids 50-50, 30x33.
BALL MILL: Hardinge conical 10'x48", 8'x48". 8'x36", complete, motors, Traylor 7'x35'.
TUBE MILLS: Smidth 6'6"x21', 5½x20'.
ROD MILL: Marcy 3'x8' center discharge, 5x12, 6'x6', 6½x12' center discharge.
AUTOCLAVES: J&C 6'6"x58' Quick Acting; 6'x50'
CONE: Symons 3', 4¼" standard head coarse bowl
KILNS: 4'x42', 5'x30', 6'x50'6", 6'4"x45', 6'x72' Vulcan 9x100, 10'6"x105', 8'x124', 6'x90', 6'x72'.
DRYERS: 6'x60', 6'x72', 5'x24', 4'6"x32', 3'6"x20', 6'x30', 5'x35' rotary current.
COMPEB MILLS: A-C 7'x24', Patterson 7x18.
FEEDERS: Synstron F55 48x72", 48x60", Jeffrey 35x72". Telsmith 36"x14', Universal 36"x32'.

CRUSHING—WASHING—CLASSIFIER PLANTS

Pioneer 26 Port. Crushing Plant, 10"x18" Model UD-2641H Diesel engine. New 1955.
Pioneer Port. 10x24 jaw 24x16 roll compl. Diesel
C-R 2540 Prim. Port. Diesel
A-W 61E 1024-106 jaw crusher
C-R Primary Port. 22x36 Jaw. Diesel.
Eagle 36x25' single screwspiral etc.
Lippman Port. **WASHMORE** washing plant, 36"x 16" sand classifier, 48"x72" revolv. scrubber etc.
Telsmith 60"x9' gravel or stone super scrubber, complete 40 HP motor
Telsmith Twin Screw sand classifier 20"x15'
Eagle 24"x25' dbl. screw washer 15 HP motor

CONCRETE PLANTS AND EQUIPMENT

Noble CA 154 Semi-automatic 150 ton 4 compt. aggregate bulk cement silo 2000 cu. ft.
Eric Strayer port. New 1955, 40 yds. per hr. 600 bbl. cement silo
Johnson 400 yd 5 aggr. 1500 bbls. cement batch 5000 bbl. silo 3-2 yd mixers
Johnson automatic batch 10,000 bbls. cement storage 3-2 yd mixers; screening equipment.
Johnson TY 228 2 compt. agg. w/TY1320 cement unit
Johnson 390 bbl. cement bin w/hopper scales.
Johnson TY-227 70 cu. yd. 105 ton 3 compt. aggr. bin TY168 batcher.
Blaw-Knox BCPC 600 bbl cement silo
B-K BCPC 400 bbl High cement bin 400 bbl silo.
Blaw-Knox BCPC 300 bbl cement bin
B-K 3 Comp. 200 yd. ag. bin, cement silo 3000 bbls., 2 Koehring 56-S mixers, charging cement hopper 141 bbls.
B-K 2 aggr. one cement 400 bbl silo. Complete

HYDRAULIC SUCTION DREDGES

Morris 6" Diesel on 14'x36' hull
Ga. Iron Works 8" suc. 6" disc. Diesel New 1957.
10" Portable Diesel powered. Complete.
12" Diesel powered, pontoon mounted. Complete.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6"
8" Hydraulic Diesel, On 32'x8' steel pontoons
6" portable Diesel complete with cutters, etc.

SCREENS

Trommel 6'x45'3" 75 HP gearhead A.C. motor.
New Holland 4'x12' 2 deck. V-belt drive
Tyler-Hummer 4'x10' 2 deck, new spare parts
Simplicity 5'x12' 2 deck
Pioneer 5'x12' 2 deck 30 HP elec. motor
C-R 4'x14' 2 deck 25 HP motor

RICHARD P. WALSH CO.
30 Church St. New York 7, N. Y.
CO 7-0723 Cable: RICHWALSH

Barber Greene model 848 **ASPHALT PLANT.** 35—Link Belt 10" **SCREW CONVEYORS** 10½'. 4—6 x 14 Simplicity **VIBRATING FEEDERS.** **HYDRATED LIME PLANT** 50 tons per day. **CRUSHING PLANTS:** Cedar Rapids Jr. Tandem; 38-V Pioneer; Iowa 1036, 1836 & 2036; Iowa 3030 **IMPACTOR. SYMONS** 3' & 4'. 3036 Dixie & 4033 C.R. **HAMMERMILLS.** 54" Stedman. Pioneer 305-W **WASHING PLANT. SHOVELS:** 54-B electric, Lima 802, Koehring 605, 37-B, N.W. 25.

Crushers: jaw; cone; gyratory; roll; hammermill; impactor; ball, rod & tube mills; screening, washing & crushing plants—Classifiers—Compressors—Conveyors—Cranes—Drills—Dump Cars—Dredges—Engines & Motors—Feeders—Generators—Hoists—Kilns & Dryers—Locomotives—Pumps—Screens—Shovels & Draglines—Transformers—Euclid Trucks.

LIST OF USED EQUIPMENT AVAILABLE.

STANLEY B. TROYER EQUIP. CO.
Box 97—Phone 500—Crosby, Minnesota

17th Anniversary SALE

CRANES & SHOVELS

Quick-Way "E" 4/10 yd. Trench Hoe or Dragline, Mounted on GMC 6x4 truck. Reconditioned.
Lorain "TL-20" ½ yd. Trench Hoe, Crane, or Shovel
Insley "K-12" Used ½ yd. Trench Hoe or Crane, 18" shoes, 8'2" wide, New 10/52, M.M. Gas Power, hoe attachment rebuilt, bucket is new. Here is a dandy.
Lorain "TL25" ¾ yd. Crane or Dragline, Cat D315 power, 1951 model. Rebuilt.
Koehring "304" ¾ yd. Shovel, GM Diesel power, 24" tracks, 12'0" crawlers.*

FRONT END LOADERS

Pettibone "125" Used Speedakl 1½ yd. Tractor-Shovel, 4-wheel drive, Torquematic Transmission, Cab, Hard Rock Lug Tires, Hercules gas. New 8/57.
Terratrac "500" Used Crawler Tractor-Shovel, hyd. controlled.
I-H "I-9" R.T. Gas Tractor w/Hyd. Front End Loader.
Ford R.T. Ind. Tractor w/Dearborn Front End Loader.
Barber-Greene "522" Crawler-Mounted Bucket Loader.
M-M "RTI" Used Ind. Tractor w/Lull "4A" ½ yd. Hyd. Controlled Bucket.

TRANSIT MIXERS

Smith 5 Yd. Mixers (2) Continental power, sealed hopper, front water entry, unmounted.
Smith 5 Yd. Mixer Continental power, large water tank, rear water entry, sealed hopper, on Dodge Tandem Truck.
Smith 5 Yd. Mixer, Ford V-8 power, open end, rear water entry, with Dynachute, mounted on Int. "LF190" Tandem Truck, 9:00 x 20 tires.
Rex 3½ Yd. Mixer, Chrysler power, 135 gal. mixing tank, front water entry, sealed door, new 1950. S.N. TD1850. Mounted on '53 IHC "LF174" tandem truck.
Rex 3½ Yd. Mixer, 2-Comp. water tank, sealed hopper, rear water entry, Waukesha power, on Dodge tandem truck.
Jaeger 3½ Yd. Mixer, sealed hopper, rear water entry, Continental power, on Dodge tandem truck.
Jaeger 2 Yd. Mixer, un-mounted. Buy it for parts. Make offer.
Jaeger 3 Yd. Mixer, S.N. J3752, Mounted on Chev. tandem axle truck.
Smith 3 Yd. Mixer, S.N. 56170, mounted on Chev. tandem truck.
Rex 4½ Yd. Horizontal Mixer, w/tower type P.T.O. Can be operated w/electric or gasoline power. Just the ticket for mixing feed or fertilizer.

CRUSHING EQUIPMENT

Universal "880 Jr. B" Used Portable Gravel Plant, 1950 model, 1016 jaw, 1816 roll, Simplicity 2x8 2½-deck screen, 3 axles, MM gas power. Capacity 75 TPH. Immediate delivery.
Peerless New 24 x 70' Portable Belt Conveyor, gas or electric power, swivel dual wheels. These are the best conveyors on the market for the price!
NOTE: All this equipment located in our yard except*. Some of this equipment can be rented. Terms!

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EIGHMY EQUIPMENT COMPANY
ROCKFORD, ILLINOIS

BARGAINS: 2 RR Tank **CARS** 6514 & 7080 gal. Pioneer 300WA Washing, CR 2036, 2236 Crushing, Noble CA506, Blaw Knox Ready Mix **PLANTS.** 8" Dredge.
3x8' **FEEDER. CONVEYORS** 18"-60" all lengths.
DRYERS: 30"x36,4x20,4½x35,6x50, 7x80
KILNS: 8x9x100', 8x124', 8x170'
300 HP 2 drum, 400 HP 4 drum **HOISTS**
CRUSHERS: 8x16, 1020, 18x36, 2036, 2236, 2250, 2436, 2836, 3042, 4042, 3648. **JAW.** 9 & 12K Gates, 10, 16, 20, 36" McCully, AC322, 636 & 848B **GYR.** 28", 36", 48" Telsmith, 2 & 3' **CONE.** 3018, 4022 & 5424 **DBL ROLL**
Lima 44T Truck, Browning WB2 Wagon, 28 ton Clyde Whirley, 30 ton Bridge **CRANES**
8' x 48" Hardinge **SCRUBBER.** Eagle 24" x 25'
MILLS: 4½x16", 6x15 Ball. Raymond 66" Roll. 5x22, 6x22 Tube, CR 1620 & 4033, Jeffrey 2415 & 4224 Gruendler 3XB Hammer.
SHOVELS: NW25, 6, 80D. Lima 34, 44, 1201. Lorain 50, 820. Koehring 1005. P&H 655A, 1055, 620W, Marion 111M, 492. Bucyrus 120B 200W, 9W. Manitowoc 4500.

MID-CONTINENT EQUIPMENT CO. INC.
8321 Gannon Ave. St. Louis 24, Mo. Wydown 1-2826

FOR SALE

SAUERMAN, 2 YD. TAUTLINE—triple drum, complete with 2 tail posts, one head post, 75 HP electric motor, control station, wire ropes, and spare parts. Hoist #PSE 2171. Condition: almost new.

W. J. Brooking,
FOOTE MINERAL COMPANY
18 West Chelten Ave., Philadelphia 44, Pa.

ROGERS 20x36 r.b. Jaw Crusher Portable Primary w/3x8 apron feeder, conveyor, 371 GM diesel power, tandem rubber. $13,500.

CEDARAPIDS 43x50 Impact Portable Plant w/42x12 apron feeder, 36"x50' conveyor, semi-portable on gooseneck steel skids. New 1954, good. $28,500 Terms.

CEDARAPIDS 2-Unit Portable Plant w/18x24 rb. Jaw Primary, feeder, conveyor, diesel, tandem rubber. Secondary 24x16 rb. double roll, 3x8 2-deck vibr. screen, rotovator, power, tandem rubber. $14,500.

CEDARAPIDS 20x36 rb. Jaw Crusher, new bearings. $6250 Can furnish apron feeder for $1350 extra.

CEDARAPIDS 20x20 Portable Impact Crusher, with feeder, underconveyor, 671 GM diesel, factory tandems. New 1952, excellent. $11,000 Rental Purchase.

CEDARAPIDS 4033 hammermill, new hammers & grates. $3500 Also one for $2000 Yard.

AUSTIN WESTERN 4x40 rb. Jaw Crusher, excellent. $1350 Yard.

DEISTER 4x8 Single Deck Screen, w/motor, excellent. $950 Yard.

SIMPLICITY 4x8 3-deck vibr. screen, excellent. $1350 Yard.

SYMONS 3x10 2-deck flat screen, good. $950 Yard.

SIMPLICITY 4x12 2-deck screen, hvy. duty mdl.D, new shaft & brgs. $2000 Ohio.

BARBER GREEN 522 Bucket Loader on rubber, new 1951, good. $1850 Yard.

BARBER GREEN 30"x50' Portable Conveyor, brand new. Bargain. $3500 Yard.

LINK BELT K360 Shovel, 1¾ cy, new 1952, used 4000 hrs, excellent. $26,500.

SHOVEL Bucket for P&H 655, new. Bargain. $950.

SHOVEL FRONTS for P&H 255a, new. $1000 Bucyrus Erie 22B, new. $1500. Unit 1030A, New. $1250. P&H 655, good. $1950.

(4) **DAVEY** 210 cfm Portable Air Compressors, w/Hercules diesel, on rubber. Rebuilt. $2200 Each. Rent $200/mo. apply purchase.

WENZEL MACHY. CO.
565 S. 10th, Kansas City, Kans., Mayfair 11710

OUR 51ST YEAR

Jeffrey Type A Hammermill 24" x 18".
American 13SC Hammermill, 25 HP West.
Climax 10x20 Jaw Crusher 25 HP Motor.
Farrel 10x4 "C" Jaw Crusher w/motor.
Cedar Rapids 14x36 Overhead Ecc. Jaw Crusher, Bronze Bearings.
Colorado 20" x 12" Double Roll Crusher.
New England 14" x 28" Jaw Crusher.
Sturtevant #1½ Rotary Crusher.
Robins 18x24 Double Roll Crusher, Knobs.
Single Roll Coal Crusher, 24" D. x 30" F.
Reliance Jaw Crusher 9" x 16"
Acme Jaw Crusher 9" x 16"
25 Yd. Cedar Rapids Secondary Portable Crushing Plant.
Niagara 1-Deck Screen 2½' x 12'
Hummer 1-Deck Screen 6' x 5'
Hummer 2-Deck Screen 3' x 4' Encl.
New Universal 1-Deck Screen 3' x 5'
New Universal 1-Deck Screen 3' x 8'
Seco 3½ Deck Screen 3' x 8'
Revolving Screen 30" x 19' lg. 4 sizes.
Revolving Screen 48" x 20', trunnions.
Telsmith Ajax Gravel Washer, 40" dia.
Small Dust Elevators for Asphalt Plants, 5" and 6" Buckets.
Asphalt Dryer, 4' x 35', Complete.
Sturtevant 20 HP Positive Pressure Blower.
Steel Grating for Walkways, 95% New.
25, 30, 40 and 50 H.P. Motors.
50 H.P. 100 R.P.M. Gear Motors
Conveyor Idlers—All Sizes and Makes.

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LOW COST—DEPENDABLE
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Air	Discharge	Suction
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Solvent	Oil Suction	Vacuum
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Pile Driver	Gasoline	Road Builders

BELTING

Conveyor	Grader	Hot Material	V-Belts
Elevator	Chute Lining	Mucker	Transmission

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PROMPT SHIPMENTS LOW COST QUALITY PRODUCTS

SPECIALS

KILNS—COOLERS—DRYERS

7' x 60' Bonnot Rotary Kilns
8'8" x 70' Ruggles-Cole Rotary Dryers
8' x 115' Vulcan Rotary Kiln
8' x 50' Vulcan Rotary Kiln
5' x 40' Rotary Kiln with 2' x 30' Cooler
11' x 155' Traylor Rotary Kiln
6' x 50' & 6' x 25' Rotary Dryers
705-24, 502-16 Roto Louvre Dryers

MILLS—PULVERIZERS—CRUSHERS

Jeffrey Hammermills 15" x 8" to 36" x 24"
Pennsylvania C-3-30 Hammermill 60 HP
Raymond Screen Mills #00#0000
Raymond #3036 Roller Mill 3 Roll
Raymond #6669 Roller Mill 6 Roll
Pennsylvania SXT 13-48; 350 HP Slip Ring
Dixie Jr. 2424 Non-Clog Hammermill
Mitts & Merrill Hogs #15CF
Hardinge 8' x 30" Conical Mill
Hardinge 10' x 48" Conical Mill 350 HP Synch.
Kennedy 3'6" x 7' Rod Mill
Tube Mill 6'6" x 21'—350 HP Synch.
30" x 14' & 40" x 13' Pug Mills

FEEDERS—CONVEYORS—ELEVATORS

18" x 16'; 36" x 6'; 48" x 8' Apron Feeders
24" x 18' Pan Feeder
60' to 90' Centers Bucket Elevators
2000'—16"; 18"; 24" Belt Conveyors

MISCELLANEOUS

4' x 8' Tyler Hummer Type 38
4' x 6' Tyler Hummer Type 72
Rotoclone Dust Collector Type W Size 36
12" Merrick Weightometers
15 to 200 ton cap. Steel Bins
10 ton Gas/Elec. Locomotive 36" ga.
25 ton Diesel/Elec. Locomotive 36" ga.

HEAT & POWER CO., INC.
ROCK PROD. EQPT. DIV.
60 East 42nd St., New York 17 N.Y.
310 Thompson Bldg. Tulsa 3, Okla.

LIQUIDATIONS

DONORA ZINC WORKS
DONORA, PA.

2—Ruggles Cole 90" x 55' Rotary Dryer.
2—Herreshoff Furnaces, 20' dia. 16 hearth.
1—Herreshoff Furnace, 16' dia. 10 hearth.
8—18" Belt Conveyors 28 to 170' long.
6—Bucket Elevators 20 to 65' high.
5—Roll Crushers; 54" x 24", 48" x 24".
6—Steel Bins; 1, 5, 6 & 7 Compartment, 1100 to 12,000 cu. ft.
Steel Buildings; Structural Steel; Overhead Cranes; Screw Conveyors; etc.

ILLINOIS

1—Vulcan 8' x 115' Rotary Kiln.
1—Vulcan 6' x 50' Rotary Kiln.
1—Ruggles Cole 5'x30' Double Shell Rotary Dryer.
1—New Penn. Non-Clog Hammer Mill, size No. 5060.

OTHER LOCATIONS

1—Allis Chalmers 9' x 130' Rotary Kiln.
1—6' x 50' Rotary Dryer, ⅜" shell.
1—5'6" x 50' Rotary Dryer, ⅜" shell.
1—3'x30' Rotary Dryer, ⅛" shell.
3—Link Belt Roto Louvre Dryers; 6'4" x 24', 3'10" x 20', 3'10" x 16'.
5—Jaw Crushers 12" x 18" to 36" x 48".
2—Gayco 8' dia. Air Separators.
1—Gayco 5' dia. Air Separator.

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PULVERIZERS: Two Allis Chalmers 8' x 12' Rod Mills with 350 H.P., 3 phase, 60 cycle, 2300 volt motors and control equipment. One 5' x 22' and one 6' x 22' Tube Mills with motors and drives.

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JAW CRUSHERS: Allis Chalmers and Buchanan, all steel, 36" x 48", class A-1. Traylor 15" x 24" with motor and V-belt drive. Other crushers 4 x 8" to 48 x 60".

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DRYERS, KILNS, COOLERS: Two 8' x 125' Kilns; one 10' x 200' Kiln; one 4½' x 40' Kiln. One 104" x 65' Dryer; one 90" x 55' Dryer; one 3' x 27' Dryer. One 6' x 50' Cooler; one 5' x 50' and 5' x 60' Coolers.

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1—30" x 36", 24" x 36", 18" x 36", 16" x 30", 12" x 24" Jaw Crushers.
2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt. 36" x 16 rebuilt Sturtevant rolls.
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No. 3 up to No. 12 Gyratory Crushers.

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We make new dryers and kilns.

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2—**BUCYRUS-ERIE** B-105 Oil Burning Bit Furnaces with Blowers
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SHOVELS 3 Lorain 1¼ yard. All are diesel powered.

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Good Rubber on above equipment and ready to go.
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60"x48" to 6"x3"

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Midwest manufacturer of rock crushing machinery and allied products needs a man with experience in manufacturer-distributor relationships in the crushed rock and gravel industry. He will be located in Chicago but must be able to make occasional trips into the field. Your reply will be kept confidential. Write Box Q-84, Rock Products, 79 W. Monroe

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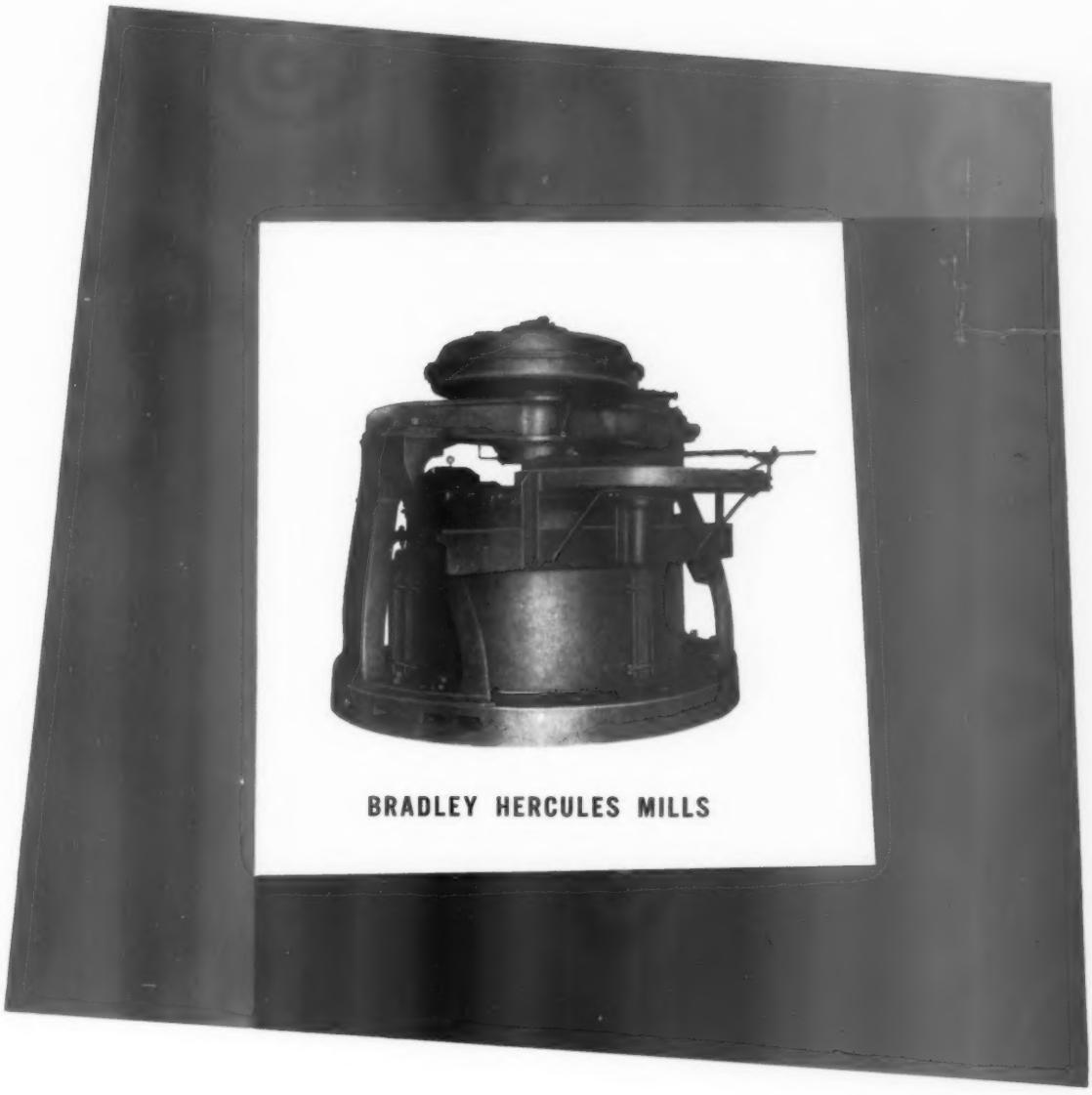

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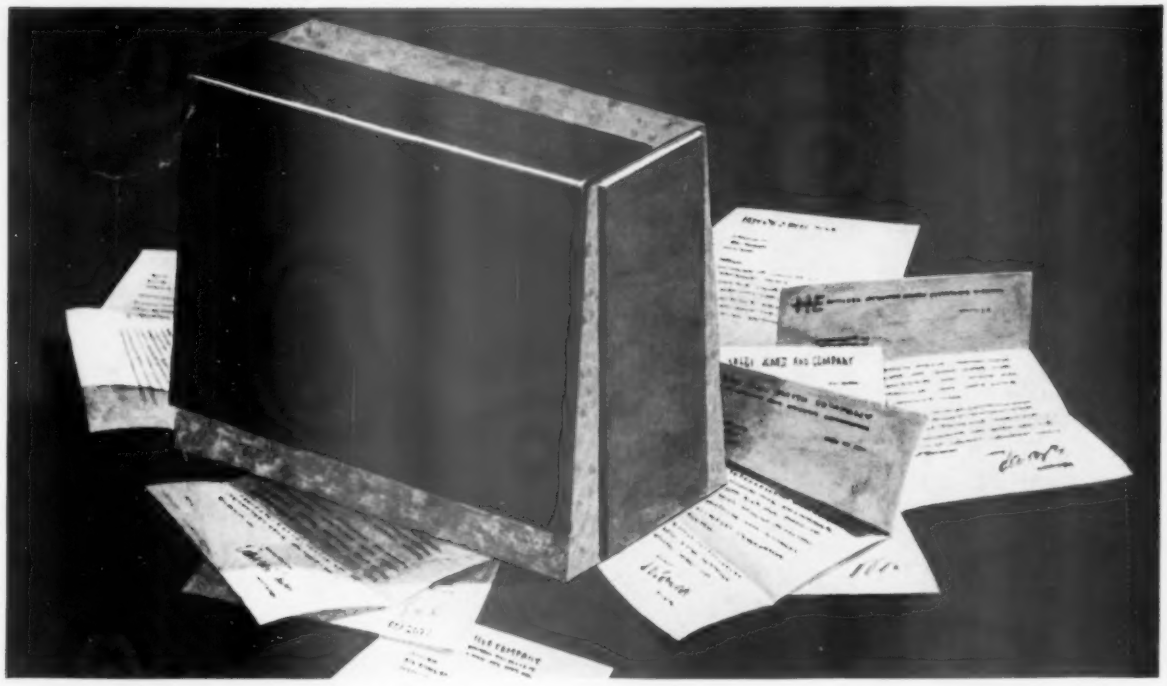

". . . definitely going back to Kaiser Unitab Kiln Liners now after comparison trial showed that (Brand C) gave less than half the service."

Kiln	Campaign	Brick	Service
#1	#1	Brand "C" (basic)	75 days
#1	#2	Kaiser Unitab Kiln Liner	192 days
#2	#1	Brand "C" (basic)	85 days
#2	#2	Kaiser Unitab Kiln Liner	185 days

". . . choice of Kaiser Unitab Kiln Liners was based on following service comparison of liners:

Kiln	Campaign	Brick	Service
#2	#1	Brand "A" (70% alumina)	95 days
#2	#2	Brand "B" (basic)	108 days
#2	#3	Kaiser Unitab Kiln Liner	183 days

Unitab Kiln Liners Increase Service Life, Reduce Down-Time

Here are the reasons why reports on Kaiser Unitab Kiln Liners consistently show improved hot-zone service:

First, the basic brick used in Kaiser Unitab Liners is *Kaiser Periclase Chrome Basic Brick*. This brick is especially designed to provide dimensional stability under loading, plus high resistance to spalling and to chemical attack by hot clinker. These features—alone—have for years been giving cement producers amazing improvements in hot-zone service.

Now, in the Unitab Liner, bonded shims and spacers add *important new reasons* for improved savings and service:

1. Simplified handling reduces installation time up to 50 per cent.
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In addition, during production start-up, the overlapping shim melts and welds clinker particles to the hot face. This quickly produces a tenacious coating that *resists spalling even through repeated shut-downs!* Think of what this means in greater production, less down-time!

If you are not already using Kaiser Unitab Kiln Liners, let your Kaiser Chemicals Sales Engineer show you how they can help you reduce kiln down-time and get increased liner service.

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